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ABSTRACT

This teaching guide on earth sciences for 3-year-old children is based on a modification of the "Plan, Do, Review" approach to education devised by High Scope in Ypsilanti, Michigan. First implemented as an outreach early childhood program in North Carolina, the science activities described in this guide can be adapted to various early childhood environments. All activities described in the curriculum's sessions are hands-on and manipulative, based on the understanding that young children learn through doing. The four sessions in this guide for 3-year-olds cover: (1) air moves things; (2) water has special characteristics; (3) there are many kinds of rocks; and (4) recycling keeps the environment clean. Each session begins with group time and a story to introduce the science concept for that session. Children are then introduced to all the possible activities for the session. As the activities are explained, materials are placed in learning centers around the room. Children then choose and complete activities in the centers, with adults "floating" from center to center engaging children in questions intended to enhance their understanding. Sessions are completed with a group review time. Resource kits or enrichment activities are included with each session, and masters of patterns that may be needed for enrichment activities are included along with lists of suggested books, fingerplays, and songs that infuse science concepts throughout children's day. (EV)

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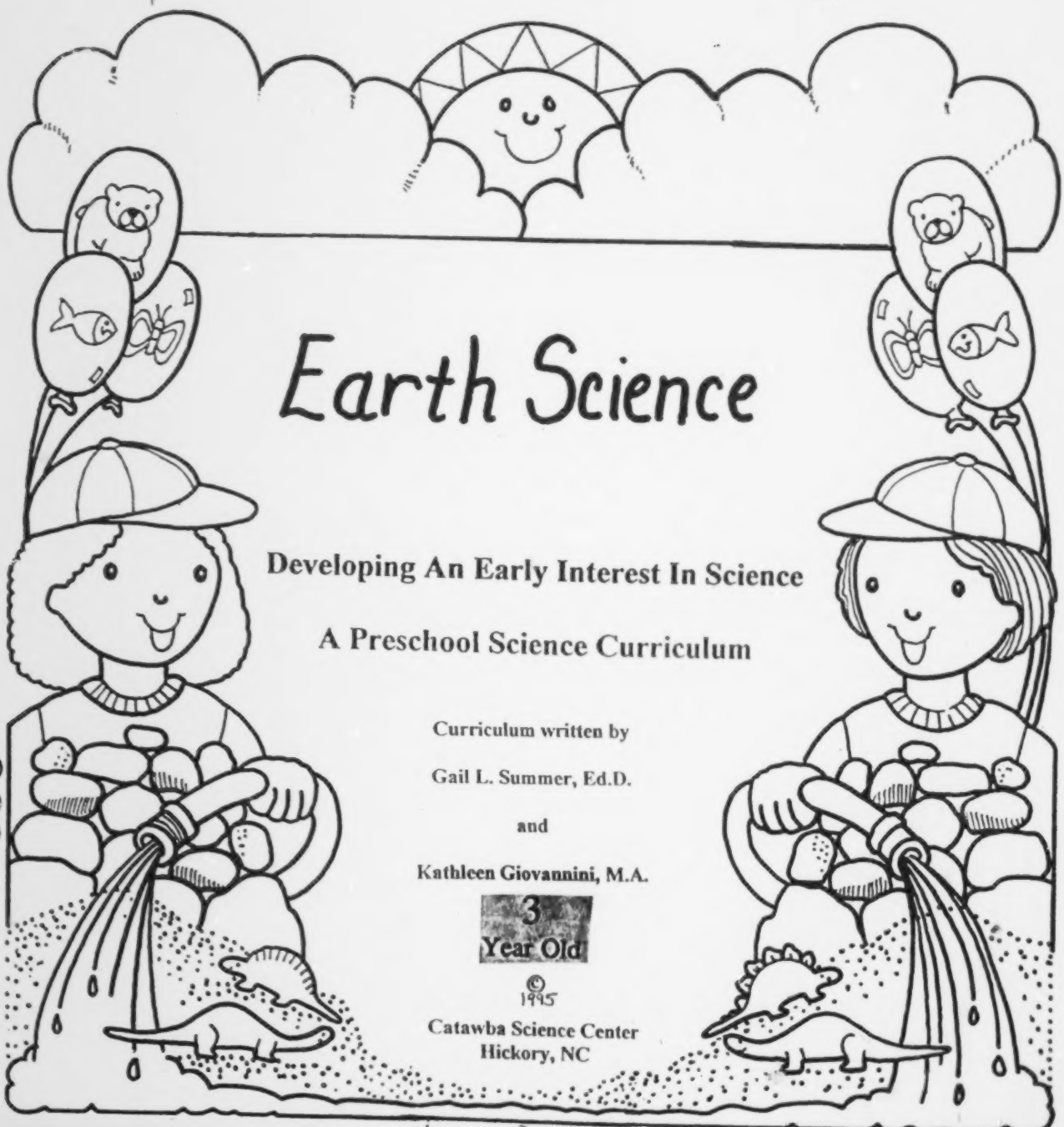

Earth Science

Developing An Early Interest In Science

A Preschool Science Curriculum

Curriculum written by

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and

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3 Year Old

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Hickory, NC

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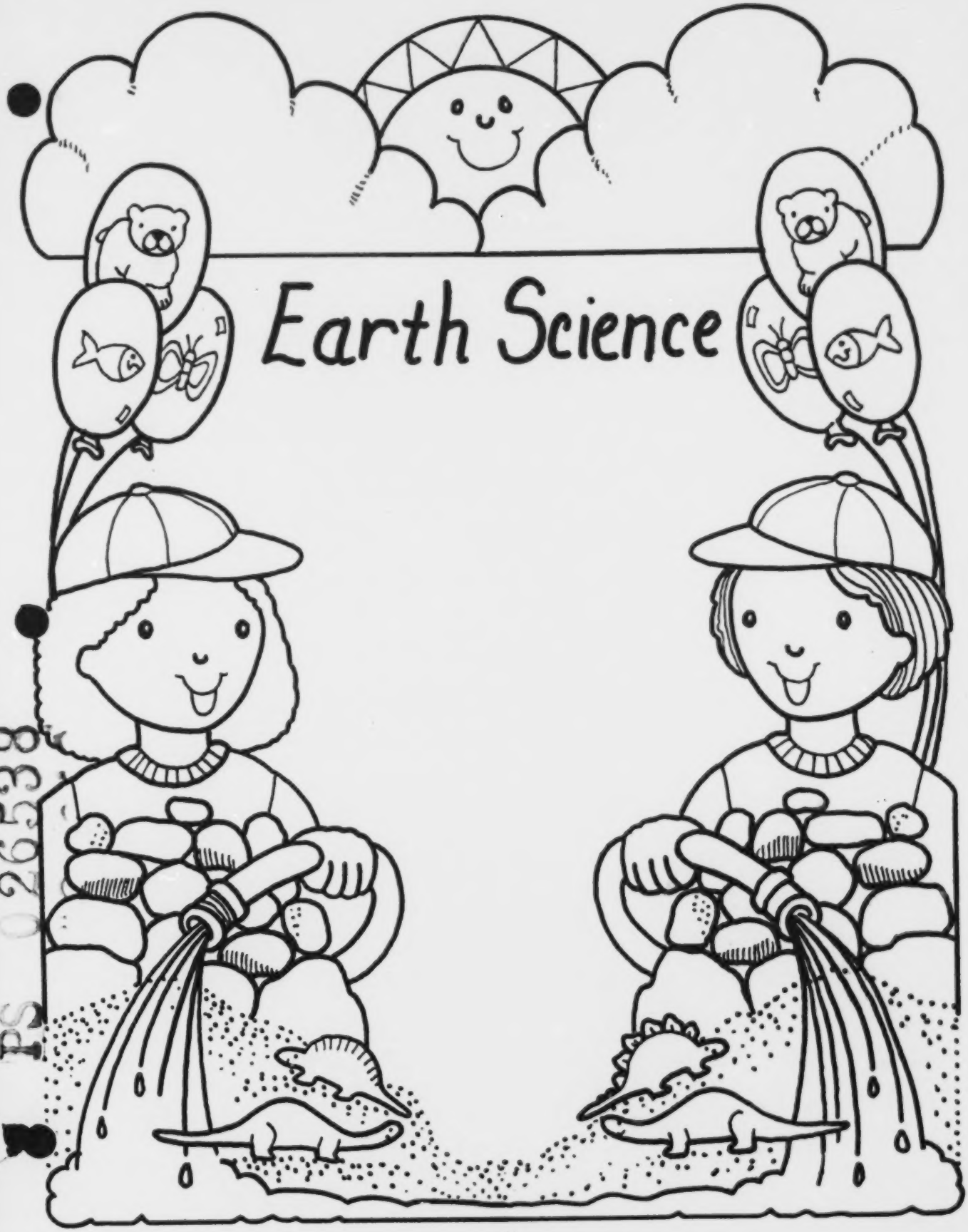

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Introduction

Philosophy

Developing an Early Interest in Science has been designed to not only develop an early interest in and enthusiasm for science, but also to excite young children about learning and discovering in general. While science is the content, the approach with which that content is presented is crucial to the success of developing an early interest in science and learning.

The young child learns in unique ways. The young child must experience science concepts. Simply talking about scientific concepts doesn't allow the child to understand and therefore attach meaning to the concepts. Perhaps the old Chinese Proverb, "I hear and I forget; I see and I remember; I do and I understand" is a good reminder of how the young child needs to experience the world. Doing is the key.

Given how the young child learns, **Developing an Early Interest in Science** is based on a modification of the Plan, Do, Review approach devised by High Scope in Ypsilanti, Michigan. The Plan, Do, Review approach introduces the concept and choices for the day, then allows each child to "plan" their activities by stating their choices for that day. After each child "plans," each implements his/her plan by "doing," or engaging in the activities selected. While the children are "doing," the teachers are interacting with them, asking questions to further elaborate the learning. After "doing," the children regroup and "review" by sharing what they did while interacting with the activities that day. The purpose of the Plan, Do, Review approach is to allow children control over their learning, while still holding them responsible for what they are learning.

Program Description

Developing an Early Interest in Science has been designed to be an outreach early childhood program. In its original form, a science educator from the Catawba Science Center in Hickory, NC visited child care/early childhood programs on a bi-weekly schedule. With each visit, one session was shared with the children. Teachers in the child care programs participated in training workshops prior to each new unit (units consisted of 4-6 sessions). The purpose of the workshops was for the teachers to make resource activities they used in their classroom after the session and to also gain an understanding of the concepts to be better able to assist the science educator while she was in their classroom.

Replication of the program in its original form is possible, but variations are also possible. The sessions could be presented at a science center with the children travelling to the museum rather than the educator travelling out to the children. The sessions may also be presented to small groups of parents and their preschoolers at a science museum for a brief morning session, somewhat similar to the library story hour idea enjoyed by parents and preschoolers for years. The sessions are also easily adaptable by teachers in child development centers for use in their own classrooms. Each session provides suggestions for numerous center ideas to enrich science activities throughout the preschool curriculum. With a little flexibility, the curriculum presented here can fit many formats and needs.

Session Description

In **Developing an Early Interest in Science,** each session begins with a circle or group time, with a song to say hello to everyone, and a story to introduce the concept for that

session. Children are then introduced to all the possible activities for the session. As the activities are shared, they are placed in learning centers around the room. After the activities are all introduced, and the children have watched where each has been placed in the learning centers, the children "plan" as they are asked one by one what they would like to do during that day's session. (This whole introductory process takes about 10 minutes.)

As children make choices, they are dismissed from the circle to begin the "do" part of the cycle by engaging in their choices in the learning centers. Adults join the children in their activity in centers by floating from center to center to engage children in questions which enhance their activity and understanding. As children complete one activity, they may choose another activity in their plan. Children are not expected to rotate through the activities on an adult schedule or in groups of prearranged partners. Some children may only complete one activity during a session due to total engagement with that activity, and that's just fine. Other children may complete several activities and that's acceptable too. There is no predetermined number of activities which should be completed and no child is forced to interact with a particular activity.

After the time for "doing" has been completed (usually about 25 minutes), the children return to the circle group time to share ("review") what they did in centers. The teacher often helps this process by asking "Johnny, what did you play with in centers today?" When a child has a hard time remembering, or is quiet and unsure of reviewing at first, the teacher can help by suggesting, "Did you play with the magnets today? What happened when you used the magnet?" The teacher is able to ask Johnny about his "plan" because she floated through the centers and observed what each child did. (Reviewing takes about 5 minutes.) After each child has had a chance to review, the concept for the session is reemphasized or recapped by the teacher, and the session is ended.

Activities

The activities which are included in **Developing an Early Interest in Science** are all hands-on, manipulative activities. Every effort is made to make the concept for each session real and meaningful for children by allowing them to experience it. For example, rather than just talk about the fact that water flows because it is a liquid, the children actually pour water through clear tubes and watch the flow in action. Rather than talk about internal body parts children can't see, special dolls are used which allow children to uncover those hidden inside body organs such as hearts and lungs. Whenever appropriate books and puppets are used to enhance language. Science develops wonderful vocabulary! Puzzles are used to help children develop fine motor skills and explore science.

Real materials are used whenever possible. Real butterfly displays are explored rather than exclusively using colored pictures of butterflies. Real rocks of a wide variety are provided. Both real and replica fossils are manipulated. There is much to be said for allowing children to experience the "real thing." Yes, some science materials are fragile, but children will never learn to be careful unless there is reason to be so. Imagine touching and feeling a real fossil from a dinosaur! It takes little enticement to be gentle with a thing so old, if children are only reminded just how precious fossils are.

Resource Activities

Developing an Early Interest in Science has also been designed to include resource or enrichment activities to further extend the concepts from each session. Some resource

activities suggest the use of real objects easily obtainable. Many other resource activities are made with patterns to produce manipulative games with which to review session concepts. Masters of the patterns and directions for their use are included with the curriculum. A brief listing of the resource activities made from the patterns along with additional suggested activities can be found in the session descriptions. More detailed directions for assembly of patterns to make the resource activities can be found in the teacher resource activity section. Lists of suggested books, fingerplays, and songs to be used by the classroom teacher in order to infuse the science concepts throughout the child's day are also included in a separate section of the curriculum.

Using **Developing an Early Interest in Science**

Whatever format meets your particular needs, it is important that you read the session through before trying it. As you read the session procedure, try to picture how and where you will lay out the center activities. Review the storybooks suggested and read them before the sessions. Practice the fingerplays before the session too. Anticipate the questions children will ask. Perhaps most important, get excited about what you will be sharing with the children! Your enthusiasm is contagious!

A suggested list of materials used in the centers is included with each unit. From time to time, materials are discontinued by manufacturers. If this should happen before you can access the materials suggested, review the session to determine how that particular material was used and select a substitute item. While the materials suggested worked well, there's nothing to say that a substitute item might not do just as well or even better.

Most important in using **Developing an Early Interest in Science** is to encourage children to play, interact, and enjoy. An early interest in science cannot be developed if children are chastised for messes and trying something that wasn't the adult intention. Science requires hypotheses and tests for hypotheses. Children are natural "little scientists" if allowed to explore. So relax and watch those little scientists blossom!

Earth Science

Session Activities

Three-Year-Olds

EARTH SCIENCE

Three-Year-Olds

Session 1

CONCEPT: Air Moves Things. (Children will become familiar with the movement of air as they observe and manipulate air's affect upon objects.)

PROCEDURES:

1. Gather the children in a circle group. Open with a name fingerplay to distribute name tags/review names. Introduce the concept of air movement with a fingerplay.

2. Open by asking what the fingerplay was about (air, wind). Move immediately into reading Who Took the Farmer's Hat by Nodset. Ask the children to listen for who takes the farmer's hat in the story.

3. Follow the story by asking who took the farmer's hat. Why was it so hard to catch whoever it was who took the hat? (Because you can't see the wind.) Talk about how we can't see or feel the air - but we can see what air does when it moves things. Then brainstorm with the children and list on a story chart all the things the children can think of that the wind moves on a windy day.

4. Next, make a large circle and get out a large parachute. Allow each child to get a handle of the parachute. Ask the children what they think will happen if everyone raises and lowers the parachute together (air will get caught under the parachute, we'll be able to feel the air move on our faces). While still sitting, practice raising and lowering the parachute just with arms at the teacher's command. Why is the parachute hard to move? (It is resisting the air.)

5. Next. ask the children to stand with the parachute. Toss some nerf balls onto the parachute. How can we make the balls fly? Pop them with the parachute. How is the air moving the balls?

6. Put the parachute away and calm down with a fingerplay or song. Once calm, tell the children that today they will be experimenting with air.

7. Explain the center options available for that day. After you have explained the centers, ask the children to choose where they would like to go. As they choose send them on their way. Allow the children to freely play and choose another center as they finish each task. Be sure to float from center to center and interact with the children as they play to reinforce the concepts for that day. The center options today are:

A. Provide materials for making streamers: 1/2 inch wooden dowels that are 6 inches long, 3 foot lengths of crepe paper (3 colors), and tape. Help children wrap the crepe paper around the dowel and tape it to the dowel. Allow 3 children at this center.

B. Provide several air boxes in centers with a variety of objects in them (pompoms, feathers, paper, sequins, confetti, pennies, etc.). Attach small fans to each of the boxes and let children try to move the various objects with the fans. (See teacher resource packet for directions to make air boxes.) Which ones does the air move? Allow 6 children in this center.

C. Provide a turkey baster for children to shoot ping pong balls around a box. Ask the children what might be coming from the turkey baster each time they squeeze the bulb which makes the ping pong balls roll. Allow 4 children at this center.

D. Provide a variety of pinwheels in a center so that children can try moving them through the air and blowing on them. Allow 6 children at this center.

E. Provide books about air and wind. Read to children at their request. Ask the children to look for pictures showing how air moves things. Allow 4 children at this center.

8. Two minutes before you are ready for the children to clean up, turn out the lights and make an announcement to warn them to begin finishing up whatever they are working on. After two minutes, turn out lights again and ask the children to clean up. Call children back to the group circle with a song. Allow each child to share one thing they learned or played with during center time. Tie in old learning about air we make with our lungs and what energy made the small fans work.

9. Close with Gilberto and the Wind by Ets.

10. Sing a good-bye song and collect name tags from children.

Resource Kit

1. Provide bubbles and bubble wands.

2 Provide canopies (large pieces of lightweight cloth, approximately 6' x 6') for experimenting with air.

3. Provide balsa or Styrofoam gliders for children to send flying in the air.

4. Provide pinwheels for experimentation.

5. Use the patterns to create the flannel board story, " *Who took the Farmer's Hat*."

6. Use the patterns to create the book "*Air Moves Things*."

7. Provide small battery operated fans and directions for making an air box. (See teacher resource packet.)

8. Suggest the classroom teacher provide the materials for making a windsock at the art center.

9. Suggest the classroom teacher provide the materials for making a flag at the art center.

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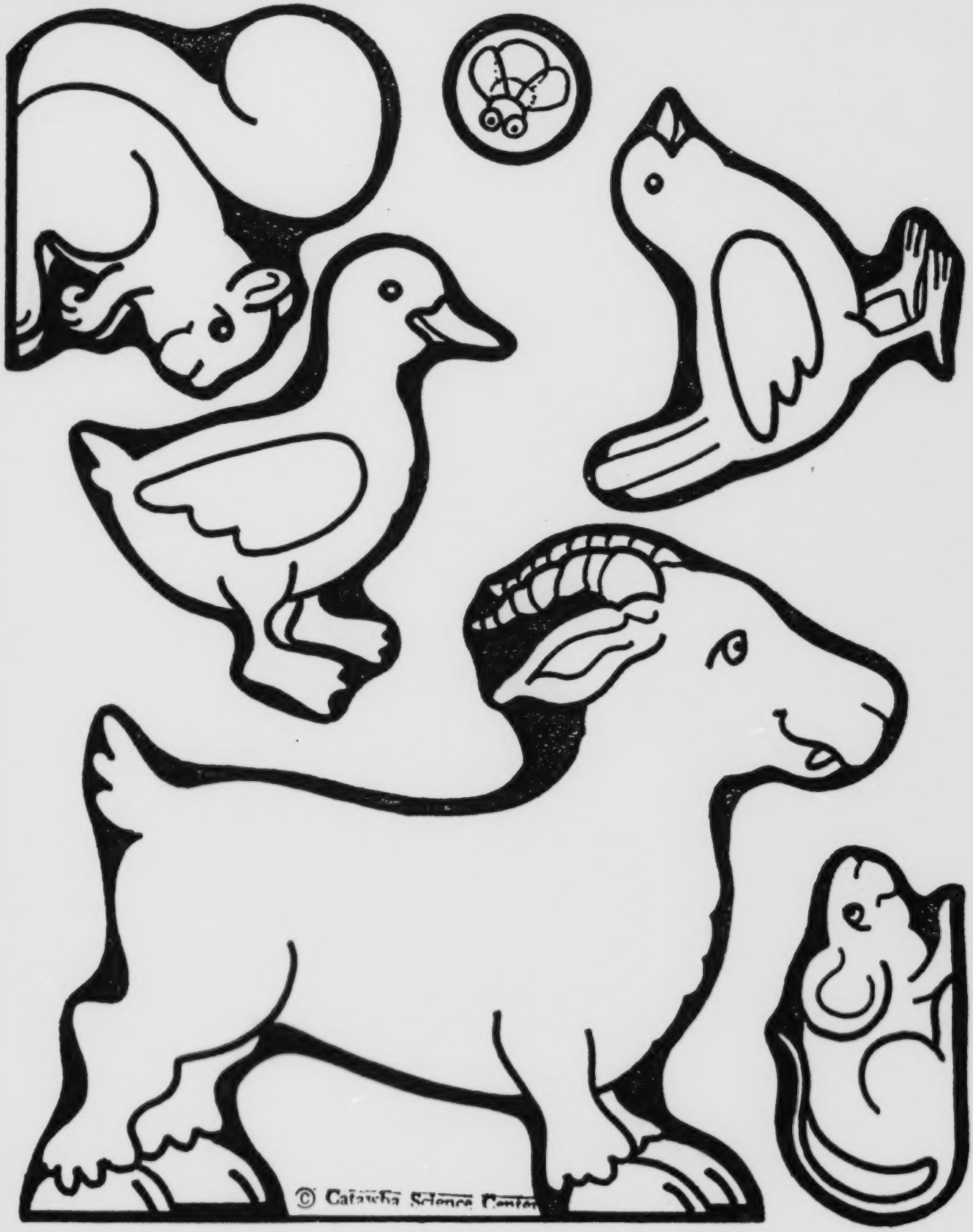

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Air
Moves
Things

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The End

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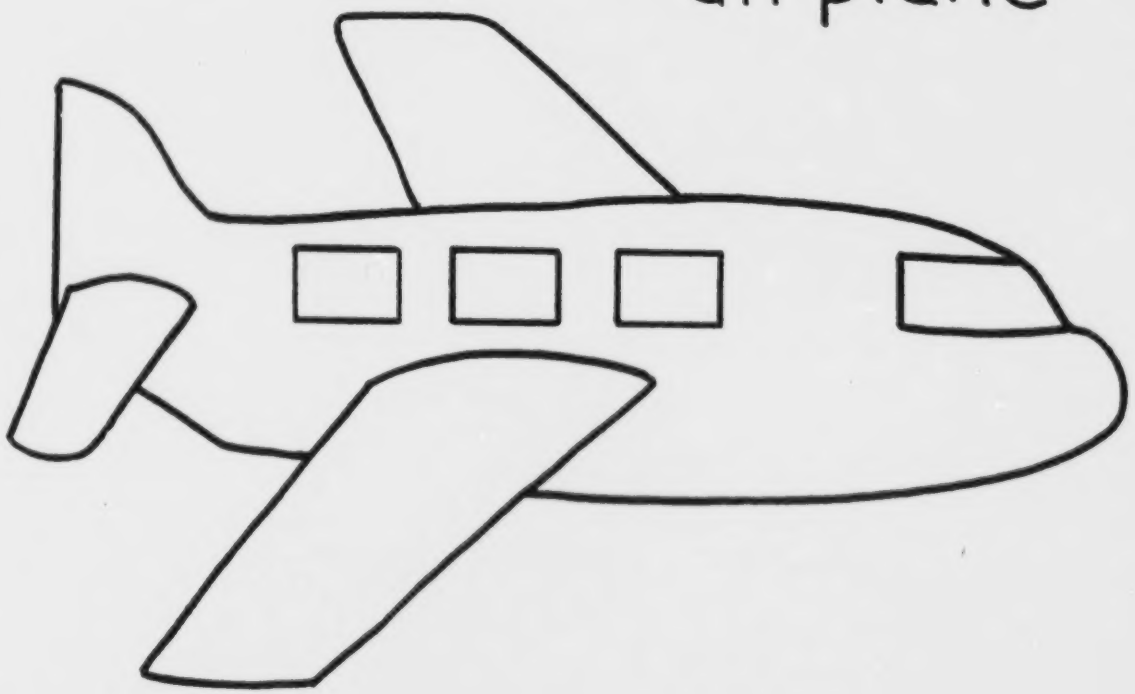
airplane



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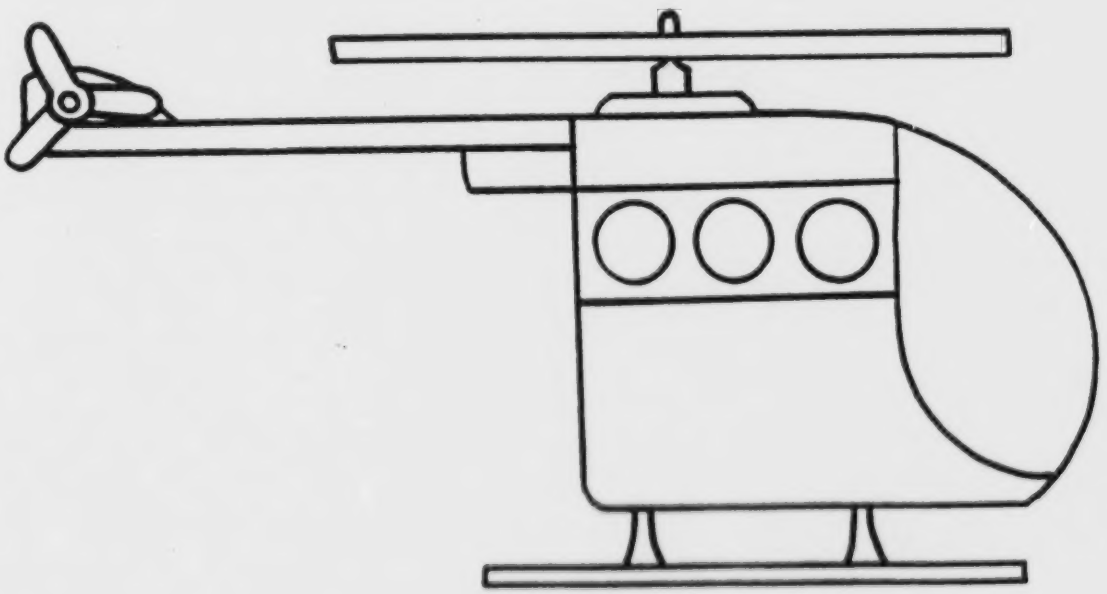
helicopter



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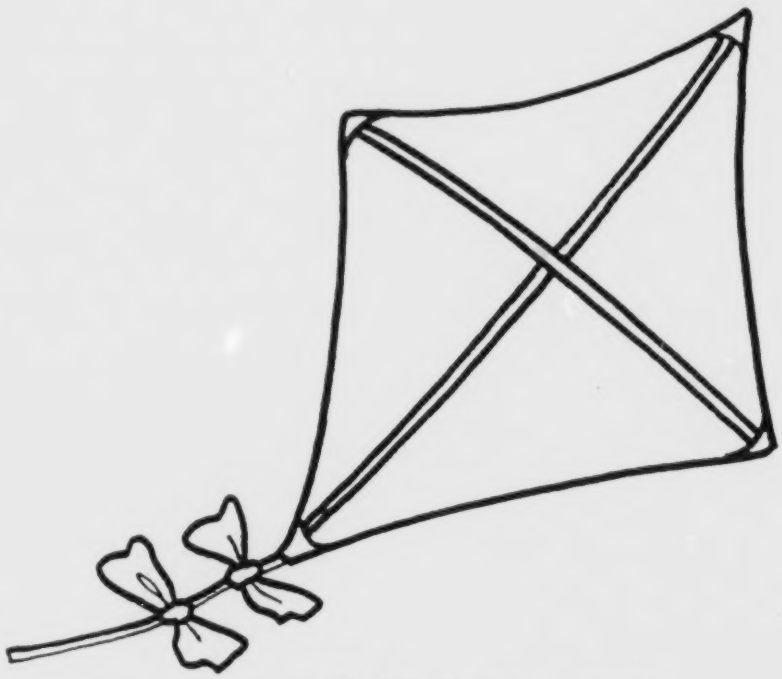
kite



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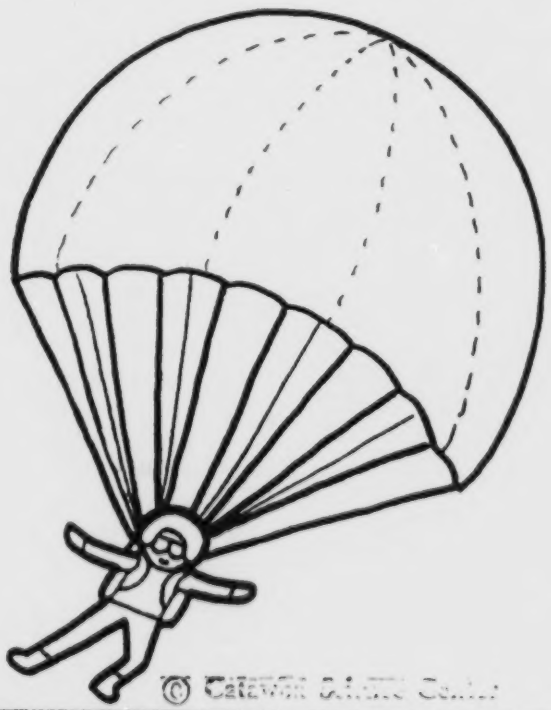
parachute



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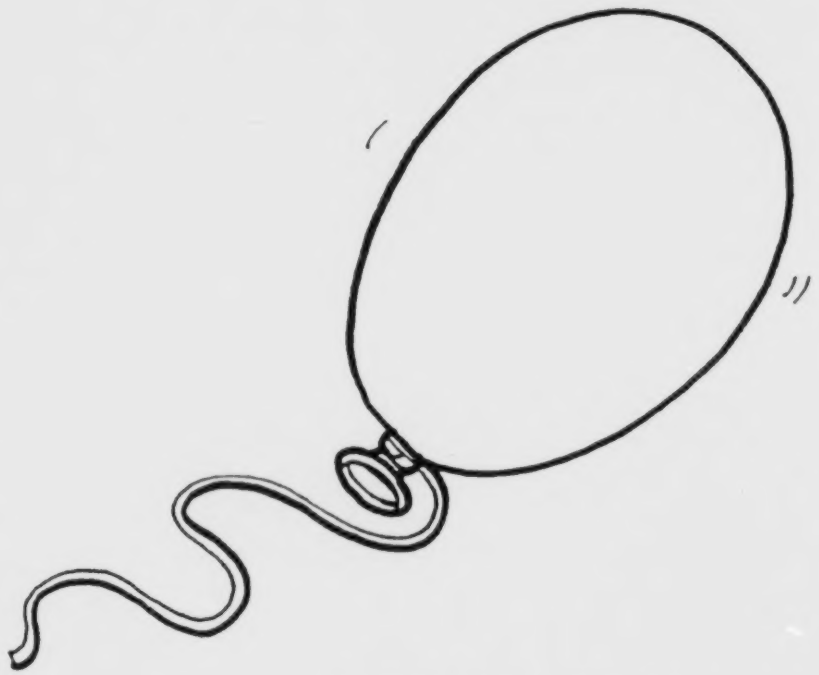
balloon



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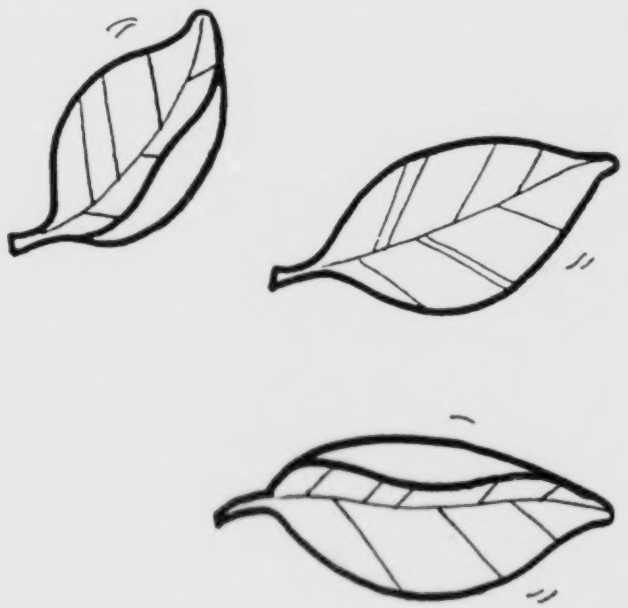
leaves



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EARTH SCIENCE

Three-Year-Olds

Session 2

CONCEPT: Water has special characteristics. (The children will become familiar with the concepts that water is wet, it flows, it turns into ice, and that some things float in it.)

PROCEDURES:

1. Gather the children in a circle group. Open with a name fingerplay to distribute name tags/review names. Introduce the concepts about water with a fingerplay.

2. Open by asking children to tell you everything they can about water. How does it feel? How do they use water? What happens when you heat it? Put it in the freezer? Read The Duck Who Loved Puddles and talk about how water changes when you freeze it. What will happen when you leave frozen water in a warm room? Put out a ziploc bag of ice for the remainder of the session. Encourage children to observe what happens.

3. Water also has other characteristics. When you spill water, what happens? (It runs, it flows everywhere.) Introduce that water flows or runs. Demonstrate how water flows with the clear pipe system. Allow the children to close off selected sections and trace the flow of the water. Demonstrate with colored water.

4. Water also makes some things float. Read Tub People and ask the children to listen for things that float in the story.

5. Do a fingerplay to resettle the group and prepare to disperse to centers. Once attention is regained, explain the center options available for that day. After you have explained the centers, ask the children to choose where they would like to go. As they choose, send them on their way. Allow the children to freely play and choose another center as they finish each task. Be sure to float from center to center and interact with the children as they play to reinforce the concepts for the day. The center options today are:

A. Provide the clear pipe system and water. (This pipe system is a series of clear plastic tubing and connectors which the children can use to form a variety of "plumbing" configurations. Some of the connectors have valves which can be turned to close sections to change the flow of water.) Encourage children to turn the valves off and on. Ask children which way the water would go. Allow 2 children at this center.

B. Provide plastic pipes and connectors. (This set of pipes are colored sections of hard plastic and connectors. They are designed for manipulation and building and not to flow water through as the set above.) Allow the children to build their own pipe system. Tell where the water would go. Allow 3-4 children at this center.

C. Provide a marble race way. The marble "flows" along the path that the water would take. Have children show you which way the water would go. Allow 2 children at this center.

D. Provide assorted objects and tubs of water for the children to experiment with sinking and floating. Sort what floats from what doesn't. Can children predict what will float? Allow 2 children at this center.

E. Provide water and a variety of toys in the water table for children to experiment. Allow 4 children at this center.

F. Provide the lock set for children to experiment with how water flows. (This "lock system" is a small canal with reservoir, pumps, water wheels, and "locks," or gates to control the flow and collection of water.) Allow the children to experiment with the locks and the water wheel pump to change the water level and flow of the water around the lock system. Allow 2 children at this center.

G. Provide several mini pumps and buckets in a center for children to use. Allow the children to pump water from the big bucket to the small cup. Allow 4 children at this center.

6. Two minutes before you are ready for the children to clean up, turn out the lights and make an announcement to warn them to begin finishing up whatever they are working on. After two minutes, turn out lights again and ask the children to clean up. Call children back to the group circle with a song. Allow each child to share one thing they learned or played with during center time.

7. Review the concepts of the day with a fingerplay about water.

8. Sing a good-bye song and collect name tags from children.

Resource Kit

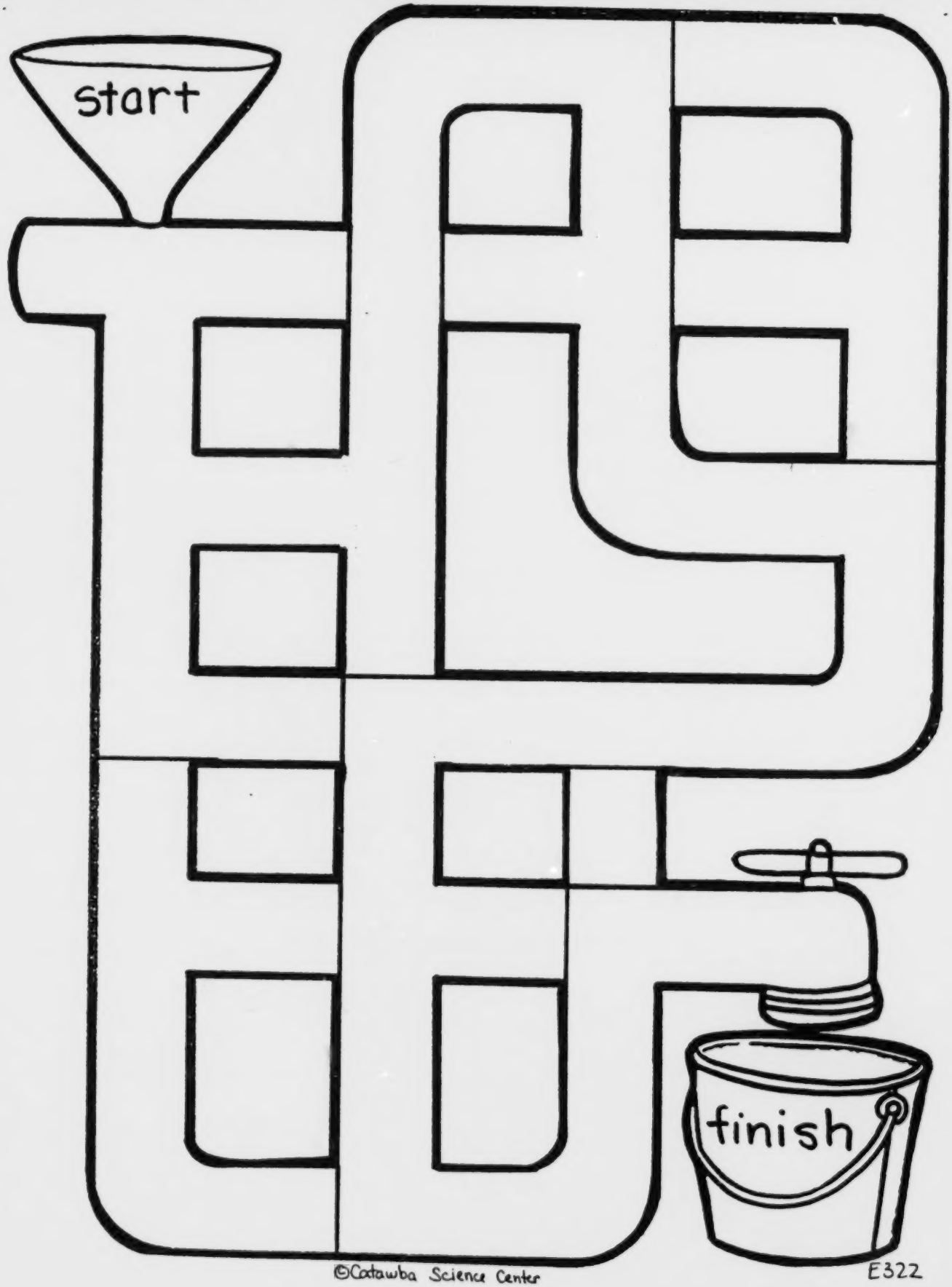
1. Provide a variety of items for water play. Suggest the classroom teacher set up a water play table for water play.

2. Use the patterns to make a paper maze to trace the flow of water.

3. Use the patterns to make a set of water pipe tiles to build pipe systems on a tabletop.

4. Use the patterns to make a sequence set showing the pumping of water.

5. Use the patterns to make a puzzle showing items which sink or float.



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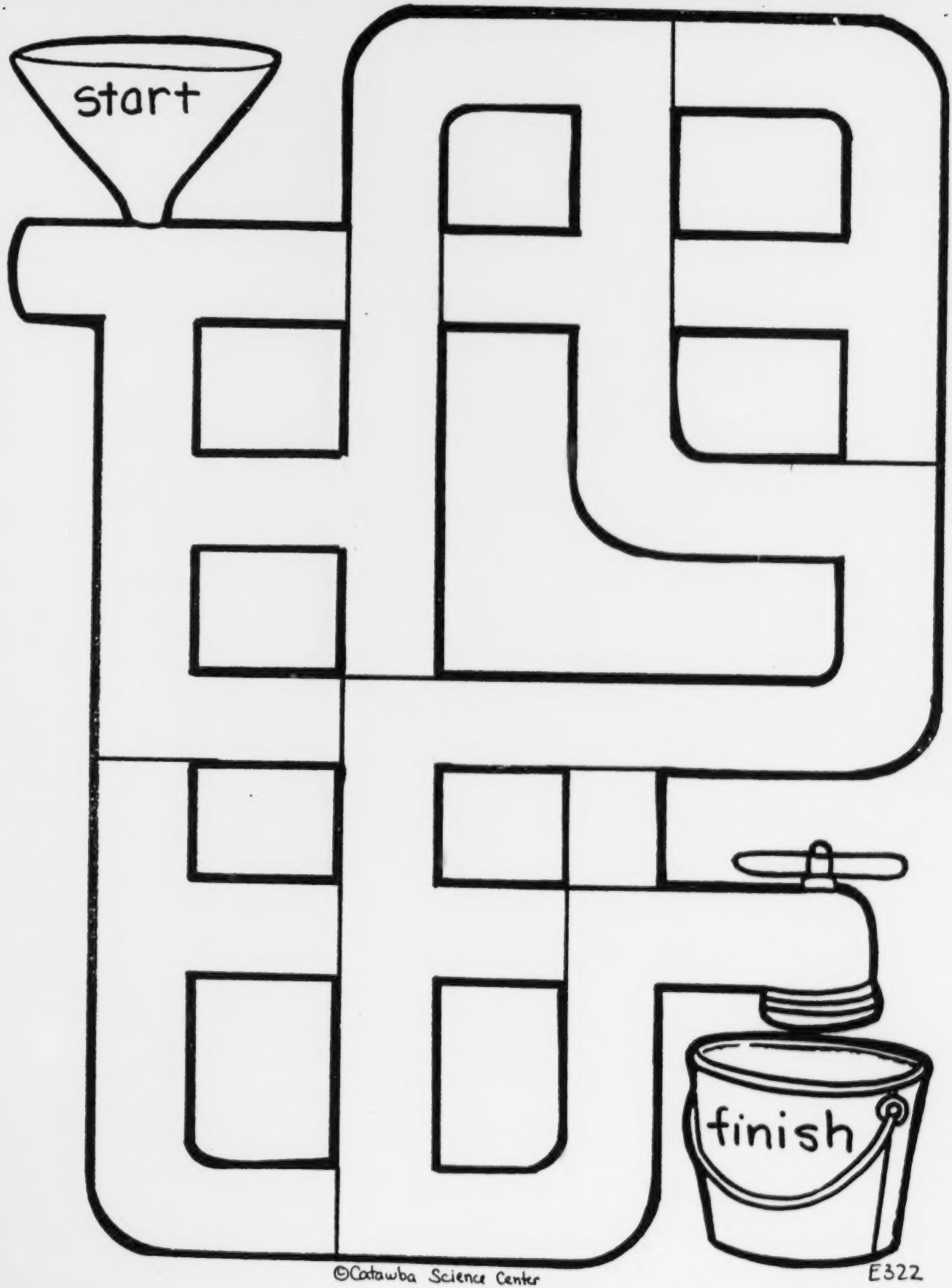

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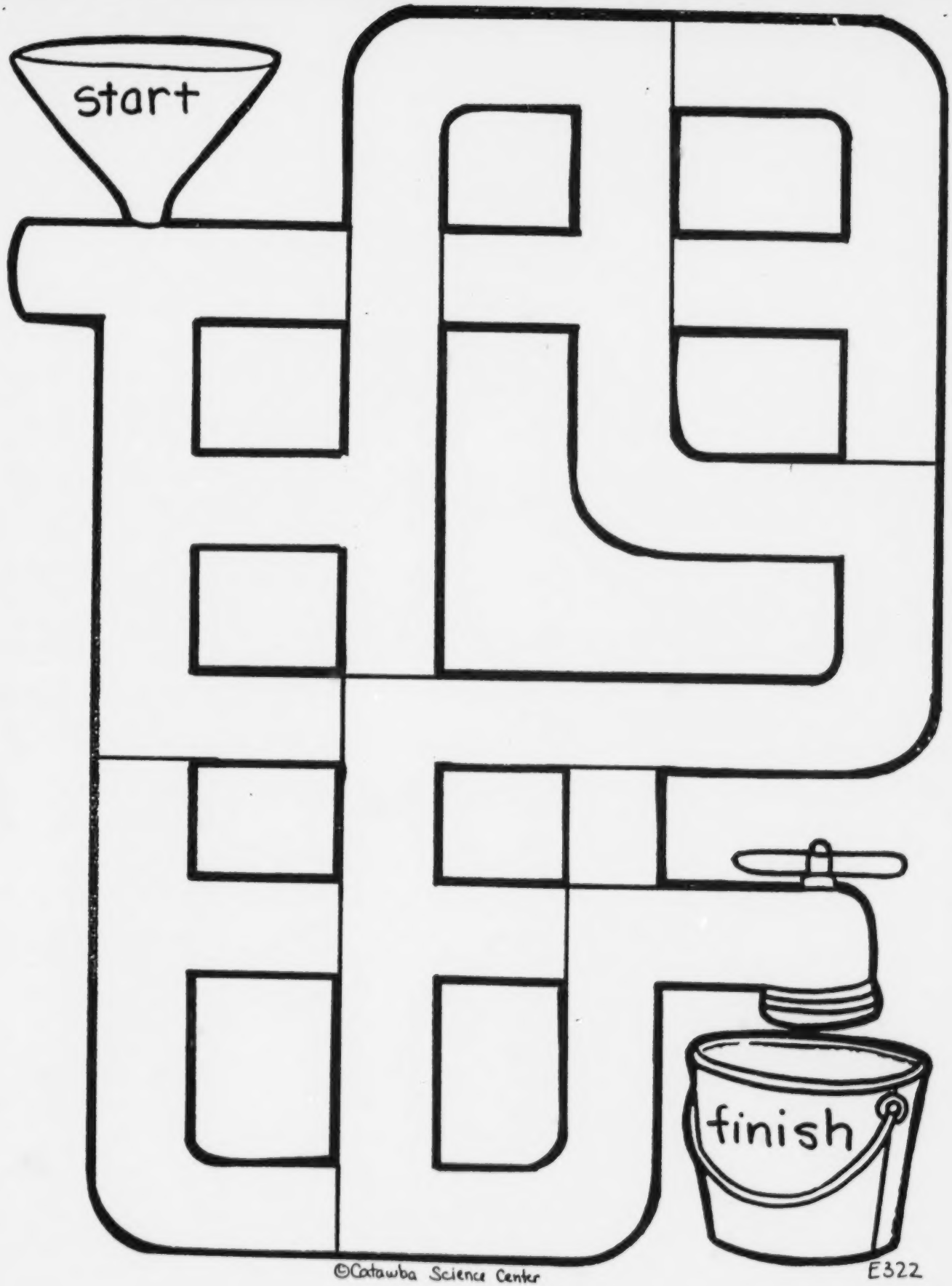

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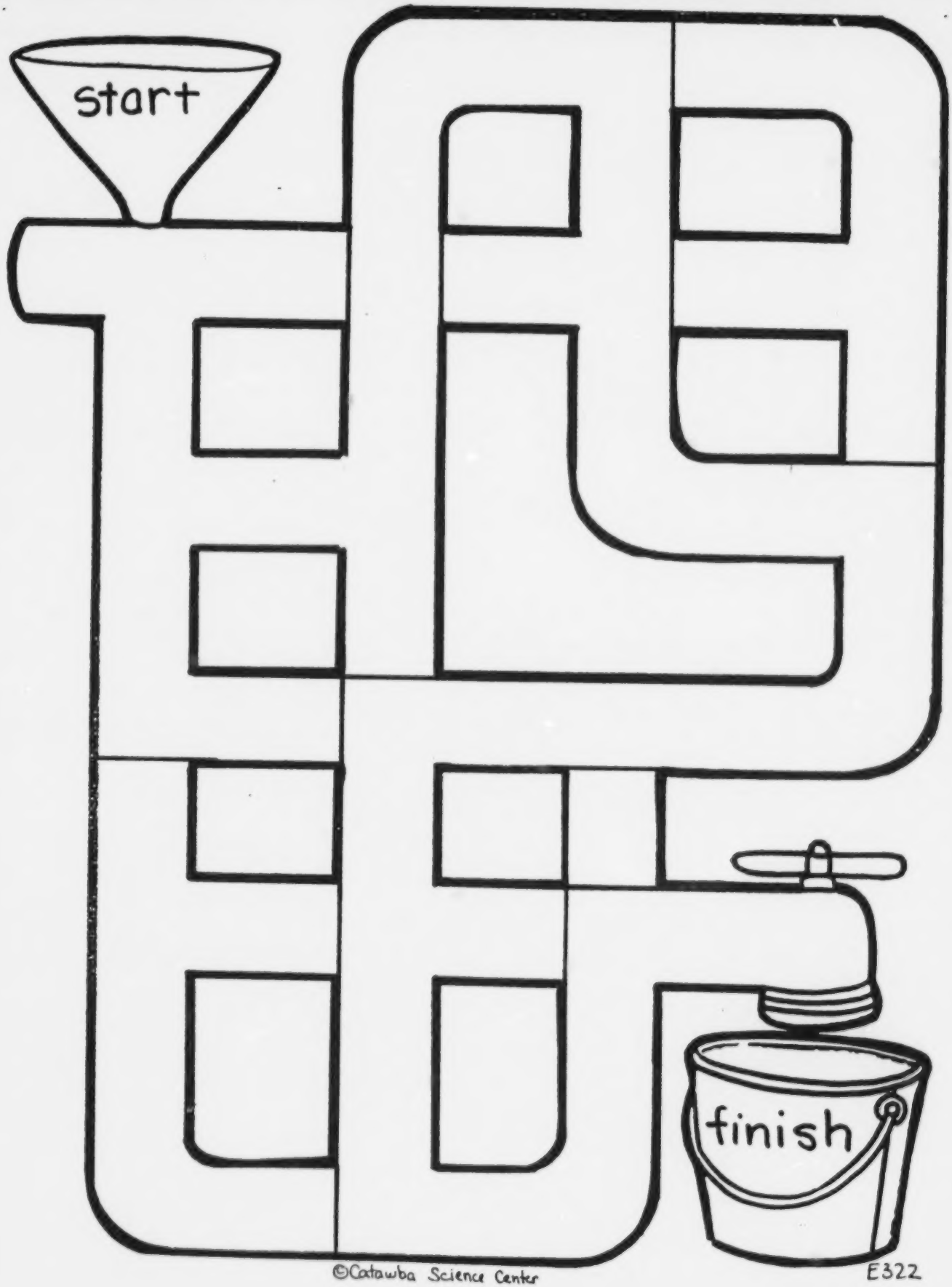

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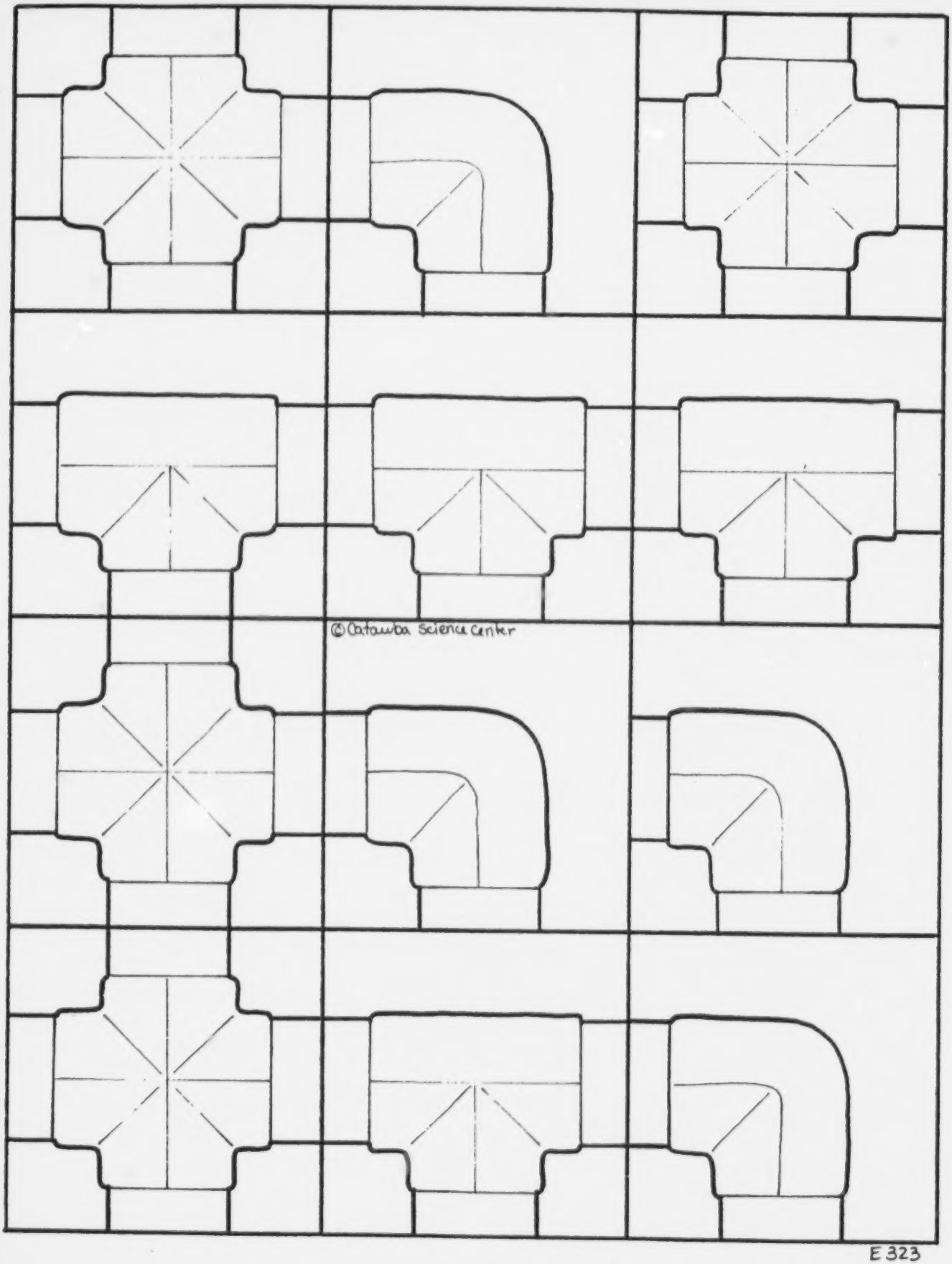
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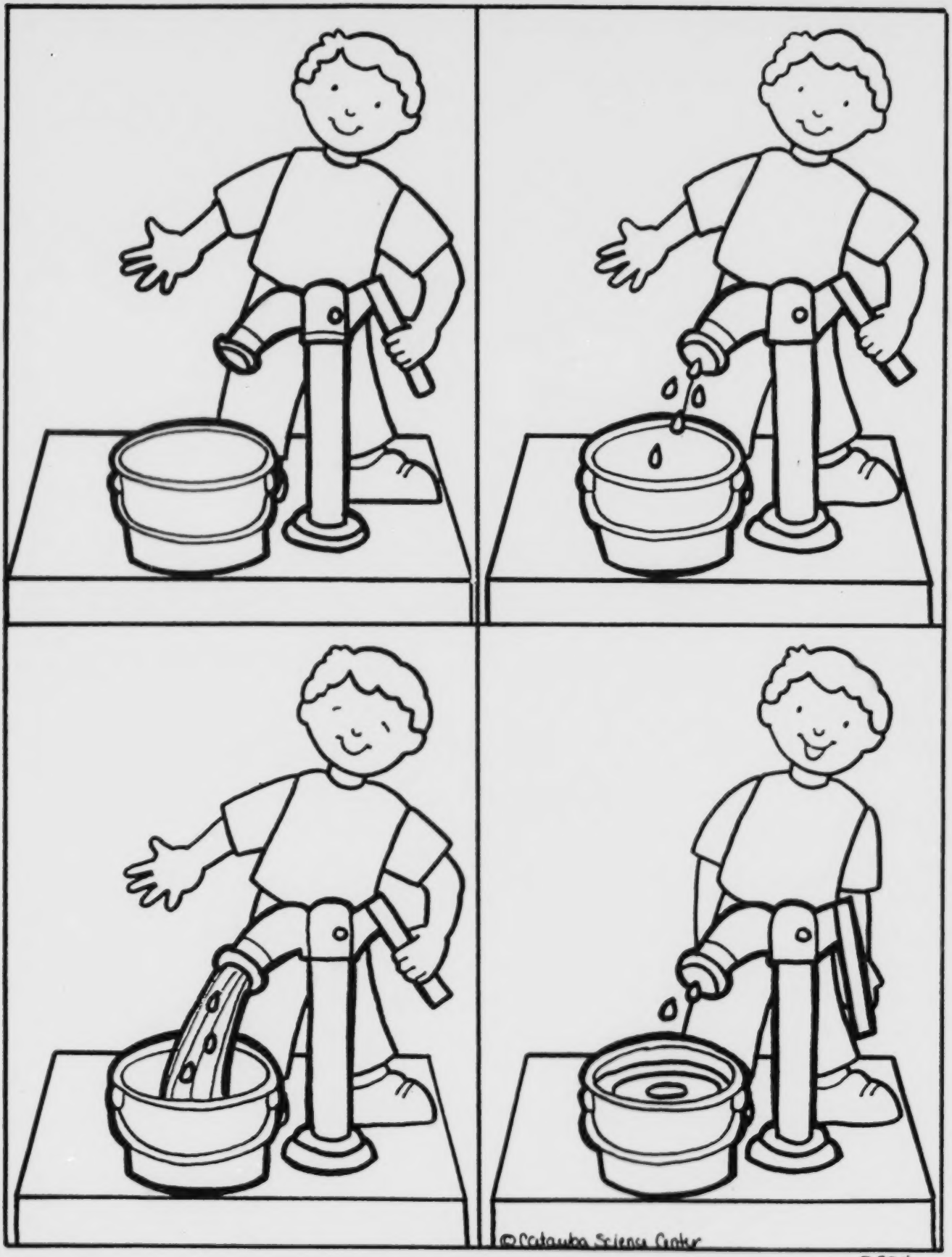

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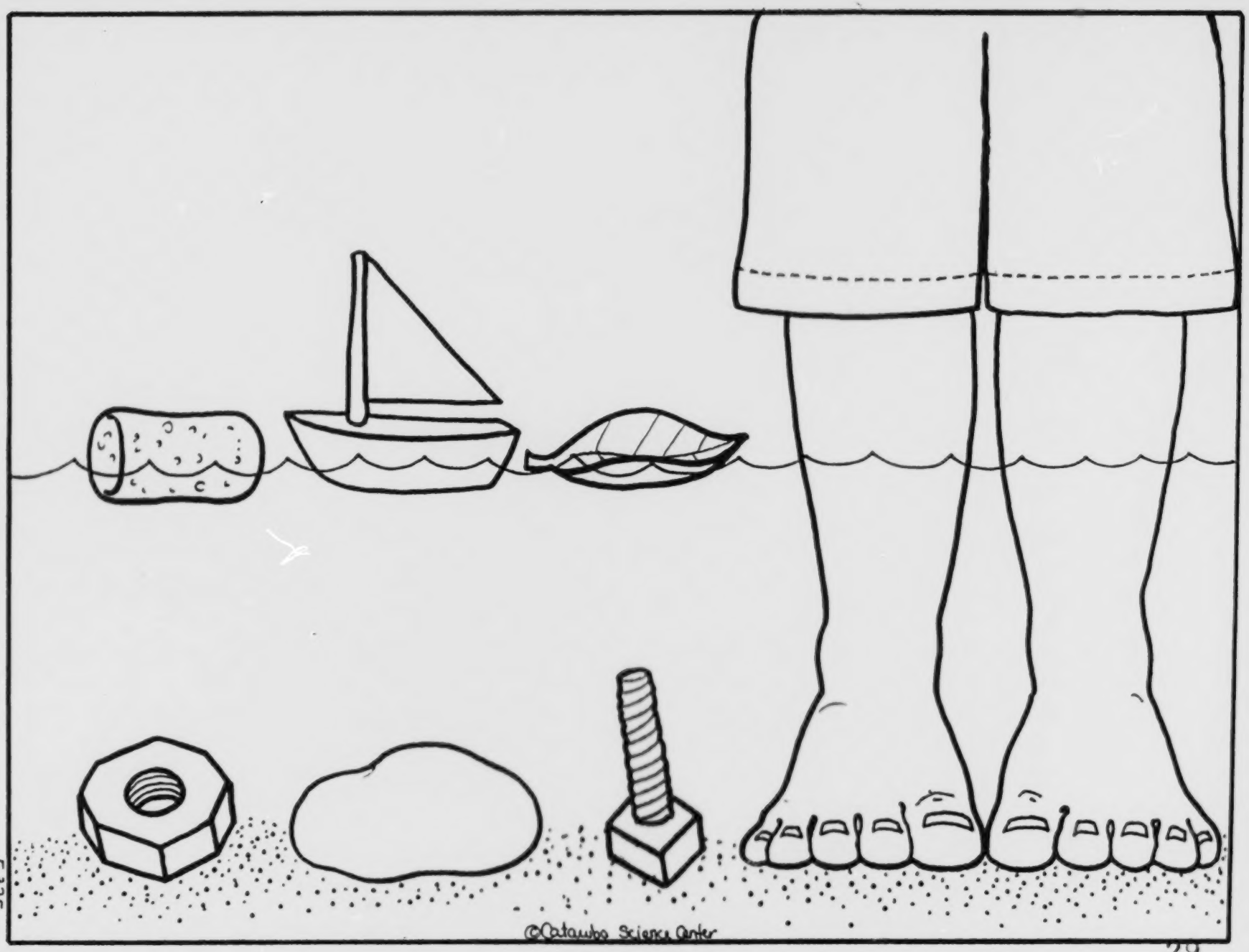
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EARTH SCIENCE

Three-Year-Olds

Session 3

CONCEPT: There are many kinds of rocks. (Children will explore classification of rocks and pretend to be geologists.)

PROCEDURES:

1. Gather the children in a circle group. Open with a name fingerplay to distribute name tags/ review names. Introduce the concept of classifying with a fingerplay about rocks.

2. Introduce the day's session with a rock collection. What are the things in the box? Allow each child to have a rock. How do they feel? Where do you find rocks? Read the book, *A First Look at Rocks* by Joyce Hunt and Millicent Selsam.

3. Using a large geode, slice it in half to show the inside. Attach two small pieces of velcro to the top and bottom edges in order to put the geode "back together again." Show the children what the "whole" geode looks like, and then open it to show what's inside.

4. Tell the children that they will get to be rockhounds in centers today. They can pretend to be geologists as they work with the rocks. Talk about skills a geologist uses: sorting, digging, sifting, weighing.

5. Do a fingerplay to resettle the group and prepare to disperse to centers. Once attention is regained, explain the center options available for that day. After you have explained the centers, ask the children to choose where they would like to go. As they choose, send them on their way. Allow the children to freely play and choose another center as they finish each task. Be sure to float from center to center and interact with the children as they play to reinforce the concepts for the day. The center options today are:

A. Provide a variety of objects for children to sort by heavy/light, soft/hard, and smooth/rough. Allow 4 children at this center.

B. Provide sifters for the children to use to find rocks hiding in a tub of dirt. Ask the children to pretend they are geologists looking for precious stones and gems. Allow 2 children at this center.

C. Provide rocks from two commercial rock collections. Let the children match the rocks in the rock collections. Can they sort them by color? Size? Texture? Shape? Allow 2 children at this center.

D. Provide magnifying glasses for the children to use to examine rock specimens. Ask them to look for things that are the same and different in the rocks. Allow 3 children at this center.

E. Provide two different sized sieves to sieve a rock mixture containing sand and two sizes of art gravel (fish tank gravel). Ask the children why different sized pieces fall out with different sieves. Allow 2 children at this center.

F. Provide a balance so that the children can weigh the various rocks in the rock collection and compare rocks that are heavier and lighter. Allow 2 children at this center.

G. Provide an assortment of geologist gear for children to wear and use in other centers: gloves, helmets, lights, goggles, hammers. Encourage the children to pretend they are geologists on a great rock hunt. Allow 4 children at this center.

H. Provide a variety of gems and rocks hidden in a tub of navy beans. Allow the children to dig through the beans to find the rocks. Allow 2 children at this center.

I. Provide books about rocks and gems. Read at the children's request. Allow 4 children at this center.

6. Two minutes before you are ready for the children to clean up, turn out the lights and make an announcement to warn them to begin finishing up whatever they are working on. After two minutes, turn out lights again and ask the children to clean up. Call children back to the group circle with a song. Allow each child to share one thing they learned or played with during center time. Review the concept for the day.

7. Sing a good-bye song and collect name tags from the children.

Resource Kit

1. Provide a commercial rock assortment for matching and sorting.

2. Provide a plastic dress-up hat to be used as a "geologist hat," and plastic goggles for pretend play.

3. Provide an assortment of magnifiers for examining rocks.

4. Use the patterns to make the book, "I Like Rocks."

5. Use the patterns to make a sequence story of sifting for rocks.

I
Like
Rocks

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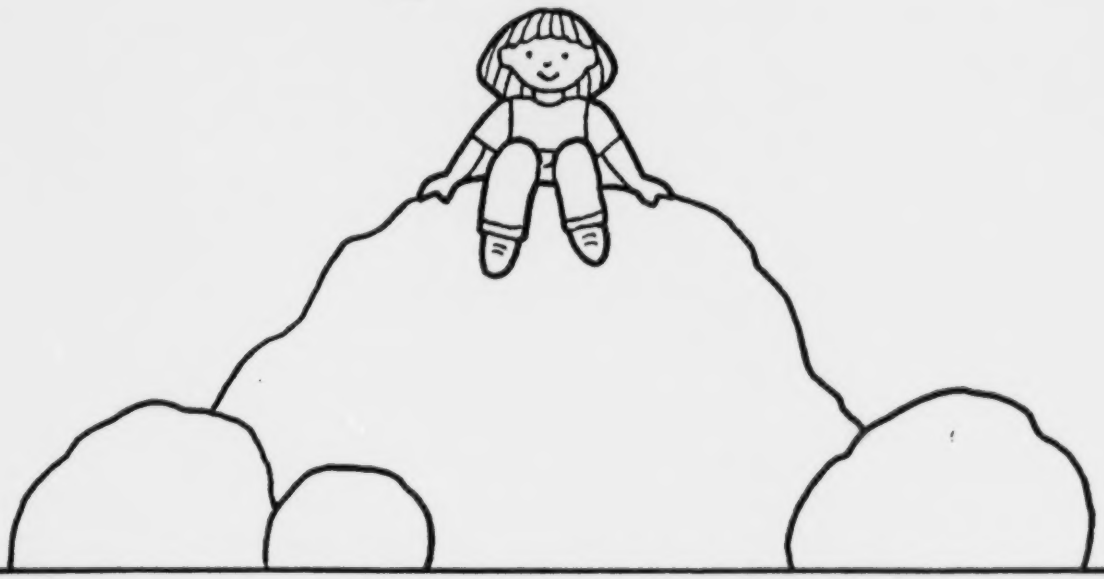
I love rocks.

E334

Big rocks.



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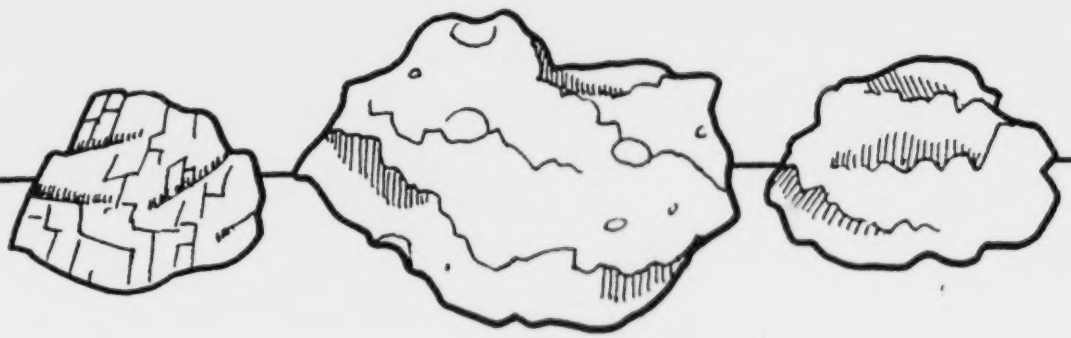
Little rocks.

E 334

Rough rocks.



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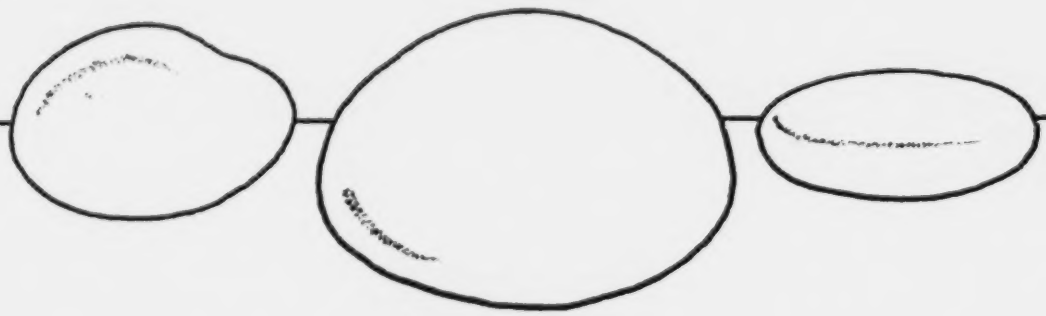
Smooth rocks.



E334

Digging for rocks.

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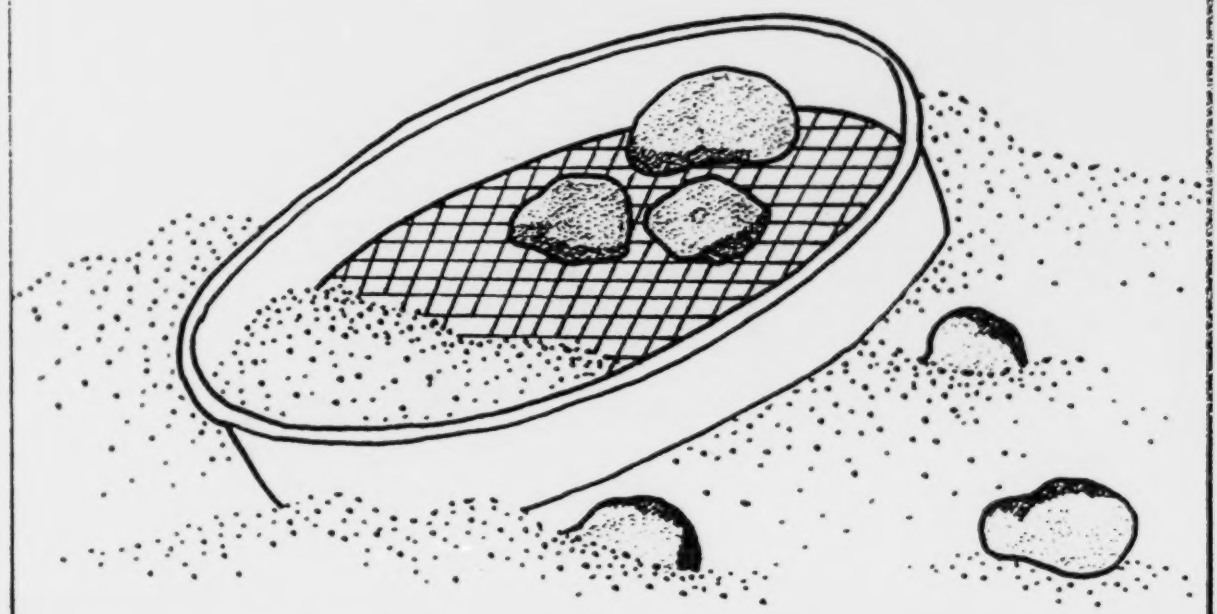
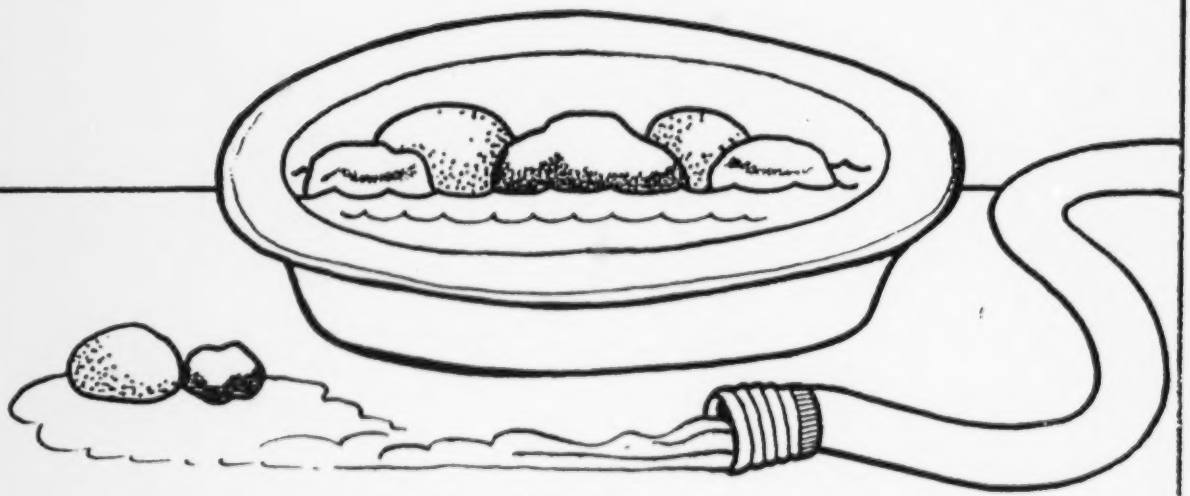
Sifting for rocks.



E334

Washing rocks.



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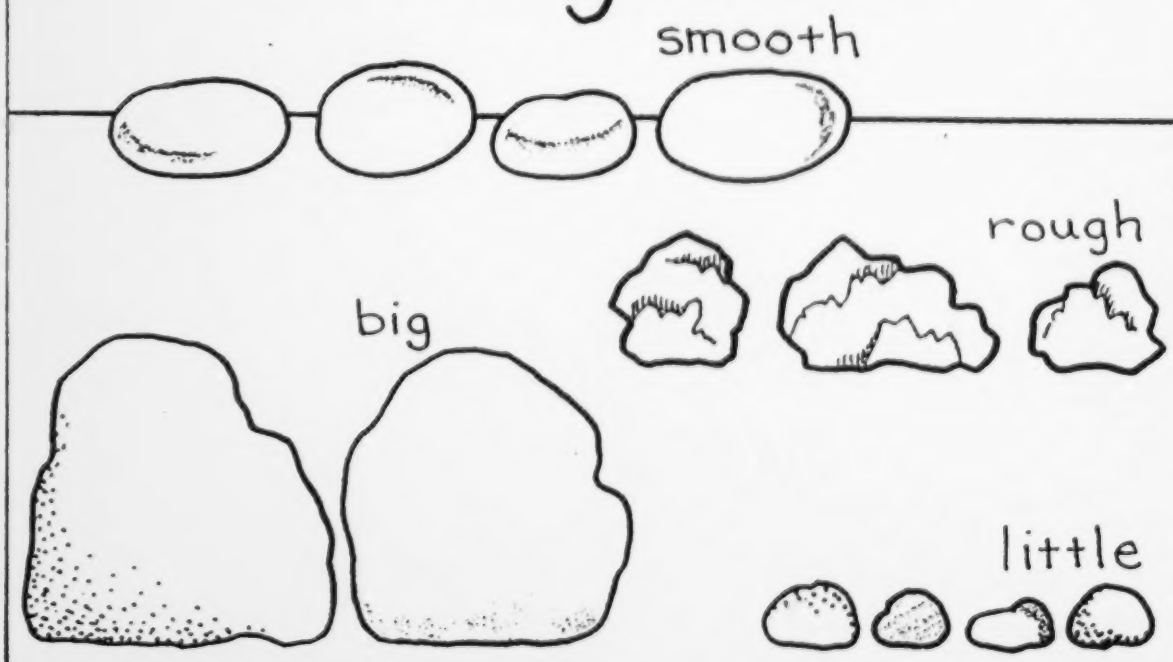
Sorting rocks.



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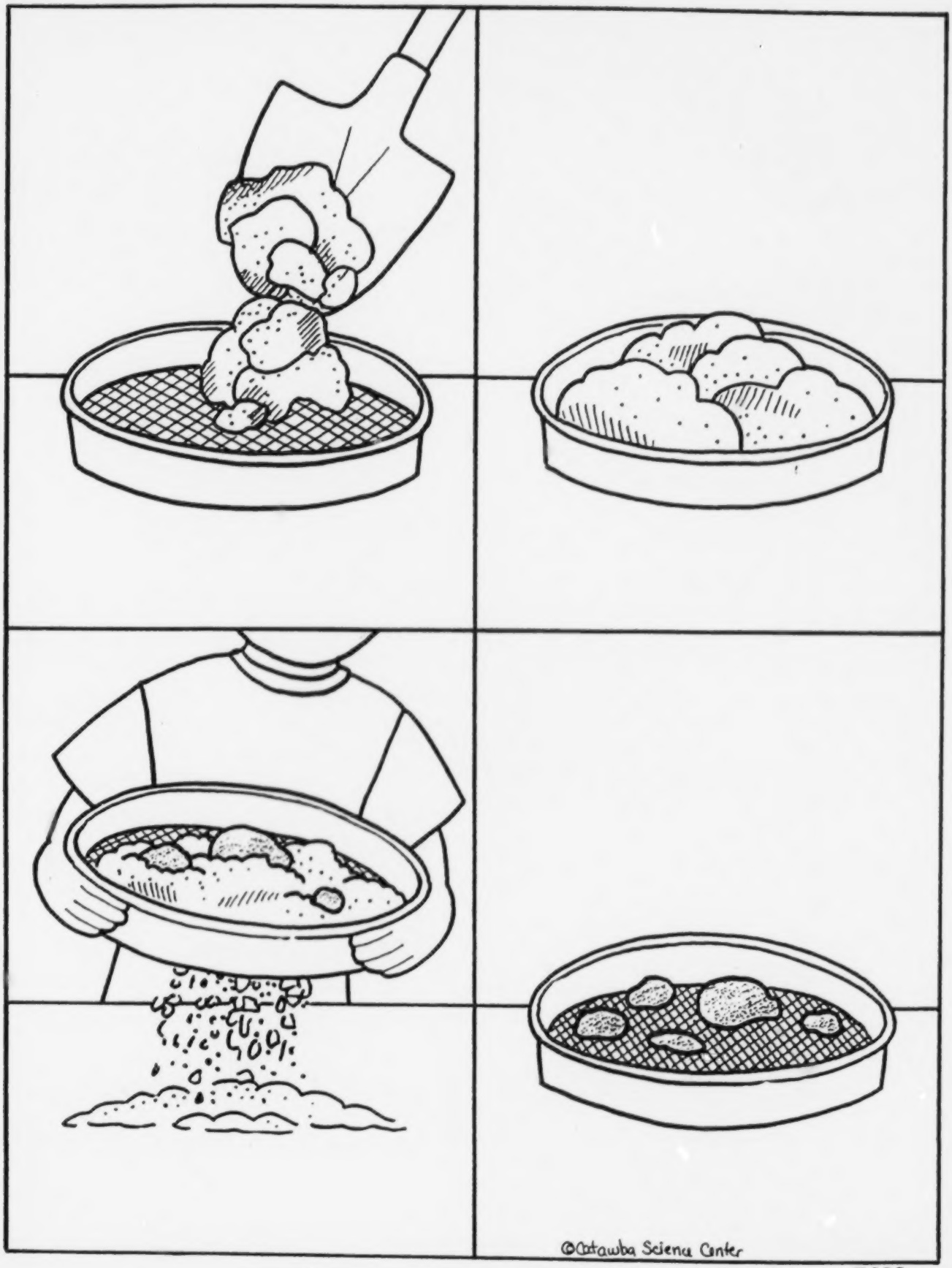


E 335

EARTH SCIENCE

Three-Year-Olds

Session 4

CONCEPT: Recycling keeps the environment clean. (The children will become familiar with recycling and renewing resources.)

PROCEDURES:

1. Gather the children in a circle group. Open with a name fingerplay to distribute name tags/review names. Introduce the concept with a fingerplay about recycling.

2. Introduce recycling with the big book, "Where Does All The Garbage Go?" Bring out a bag with an assortment of recyclable items. Why not just throw the items in the garbage? How does recycling help keep the environment clean? We recycle glass, paper, plastic, metal cans. What happens to the things we recycle? They are used to make more glass, paper, and plastic.

3. Show large pictures of areas that are littered. Allow the children to tell you what needs to be done to clean up the picture.

4. Do a fingerplay to resettle the group and prepare to disperse to centers. Once attention is regained, explain the center options available for that day. After you have explained the centers, ask the children to choose where they would like to go. As they choose, send them on their way. Allow the children to freely play and choose another center as they finish each task. Be sure to float from center to center and interact with the children as they play to reinforce the concepts for the day. The center options today are:

A. Provide a variety of materials (glass, plastic, metal) to recycle. Allow the children to sort the recyclable items into mini recycle bins. Allow 3 children at this center.

B. Provide small margarine tubs that children can fill with beans, paper clips or confetti to make noisemakers. This activity allows the children to reuse an item in a new way. Allow 4 children at this center.

C. Provide several cloth grocery bags for the children to use to go to the grocery store. Place a variety of foods out for the children to choose while shopping. Remind children how using cloth bags help reduce the amount of trash we make. Allow 4 children at this center.

D. Provide quart size plastic milk containers. Allow children the choice to make a bird feeder, sand scoop, or ball catcher. The teacher should then help the children to make whatever they choose. Allow 2 children at this center.

E. Provide the garbage truck puzzle in a center for the children to put together. Allow 1 child at this center.

F. Provide the Little Tykes Recycling Truck and Little Tykes Garbage Truck for pretend play in the block center. Allow 2 children at this center.

5. Two minutes before you are ready for the children to clean up, turn out the lights and make an announcement to warn them to begin finishing up whatever they are working on. After two minutes, turn out lights again and ask the children to clean up. Call children back to the group circle with a song. Allow each child to share one thing they learned or played with during center time. Review by graphing glass, metal, and plastic items on a large plastic bar graph.

6. Sing a good-bye song and collect name tags from children.

Resource Kit

1. Use the patterns to make a lotto game of a littered scene to match to a cleaned-up scene.

2. Use the patterns to make a sequence story of recycled glass being changed into a new glass product.

3. Use the patterns to make a sequence story showing reusing a plastic milk container to make a bird feeder.

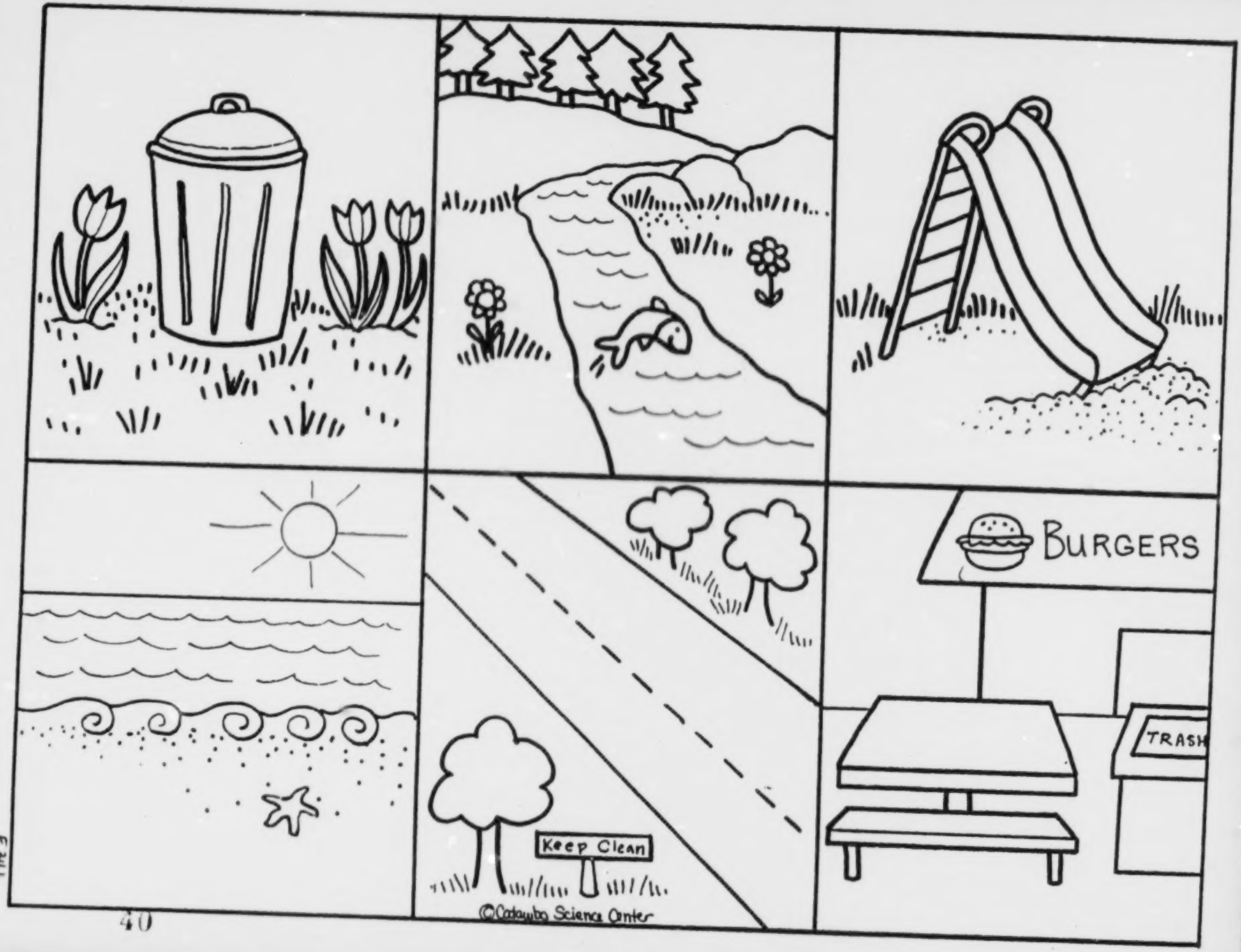
4. Use the patterns to make a sequence story showing reducing the amount of trash by using cloth grocery bags instead of paper or plastic.

5. Use the patterns to make a sequence story of taking out recyclables to the recycling truck.

6. Suggest that the classroom teacher provide an assortment of recyclables for children to sort.

7. Suggest that the classroom teacher provide a variety of recyclables and "trash" to use to make "sculptures" at the art center.

8. Use the patterns to make a game to sort pictures of recyclable materials.



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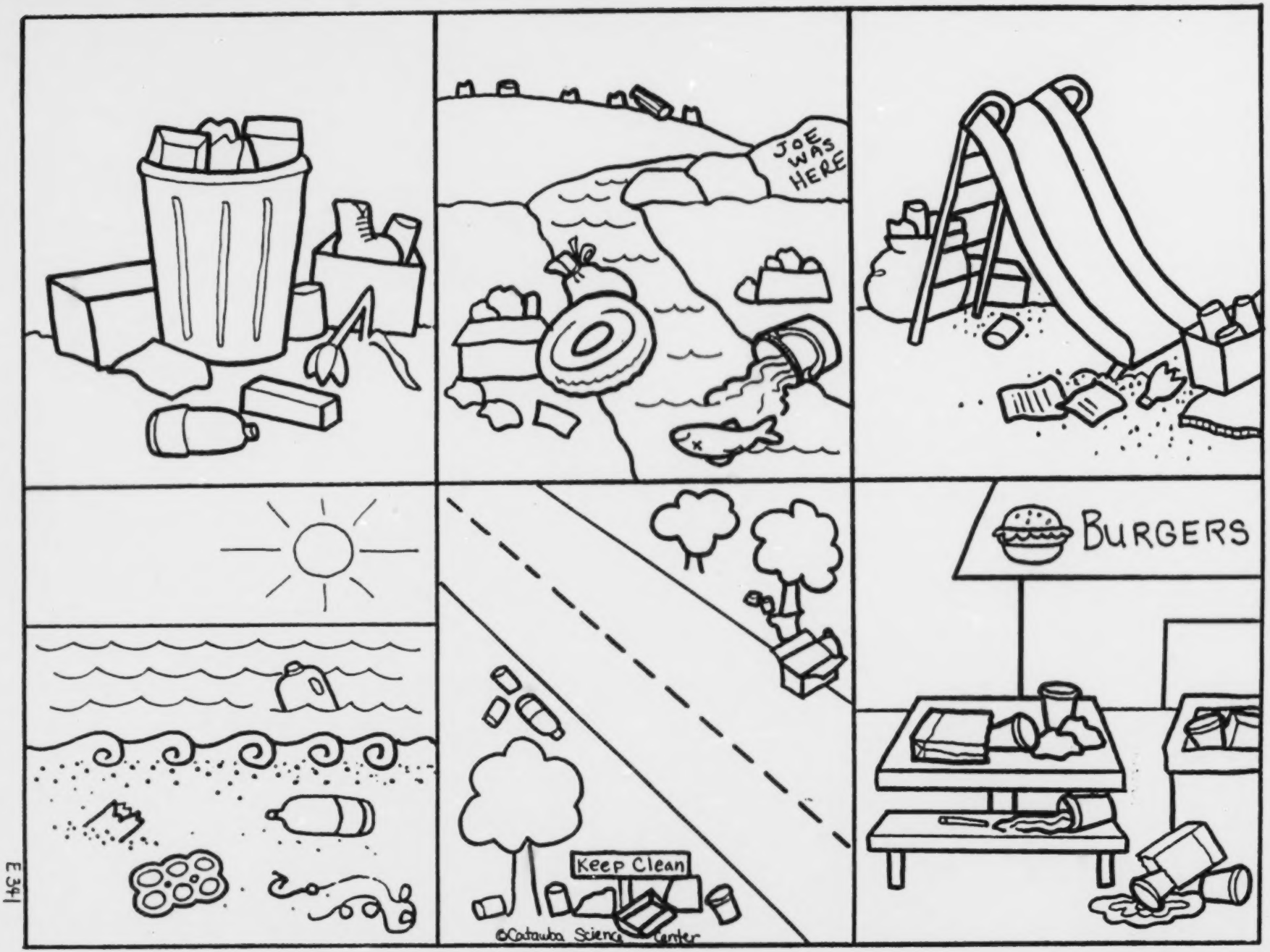
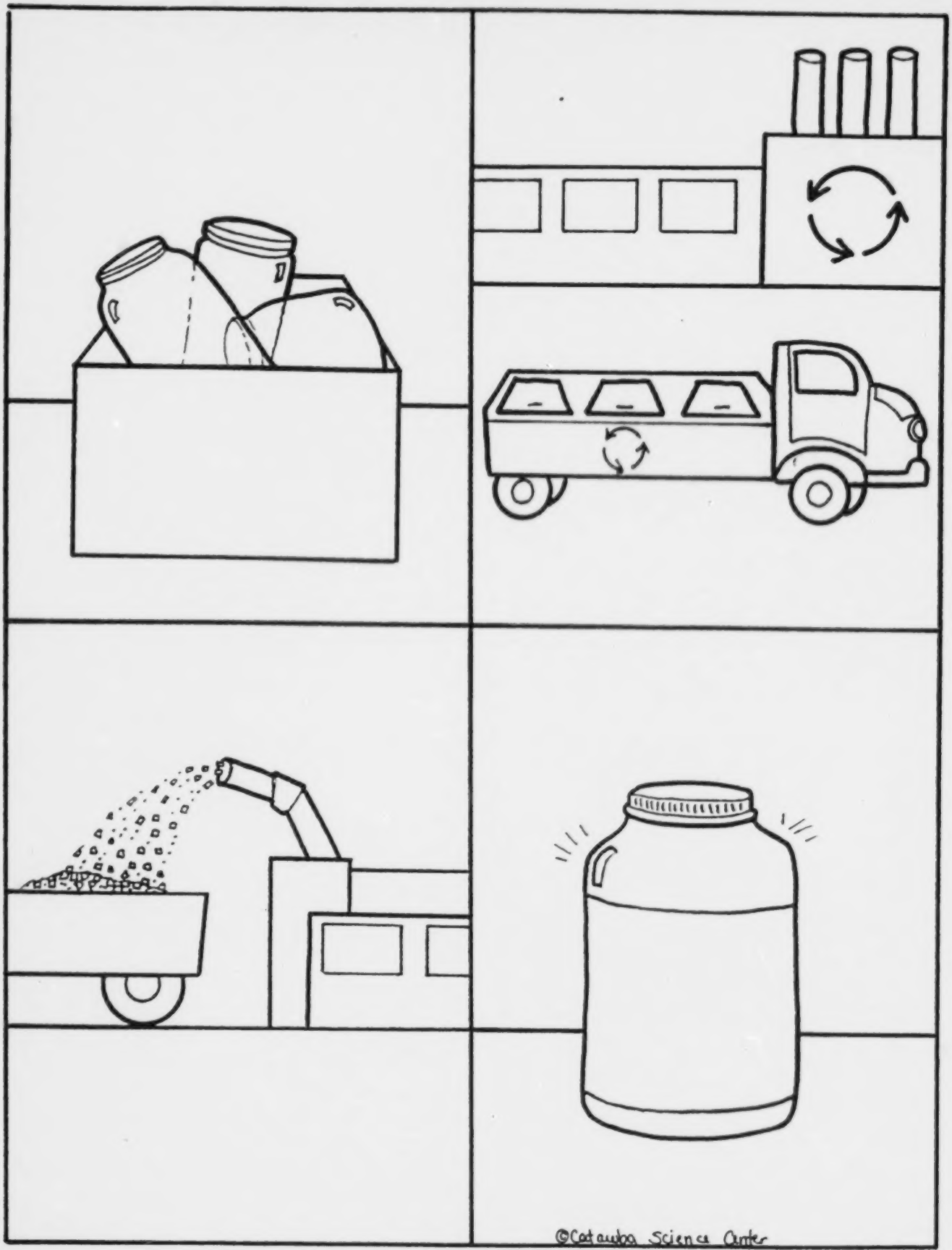


E 341



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E 342

MILK
©Catawba Science Center
E 343

Speedy Mart
CHECK-OUT
$
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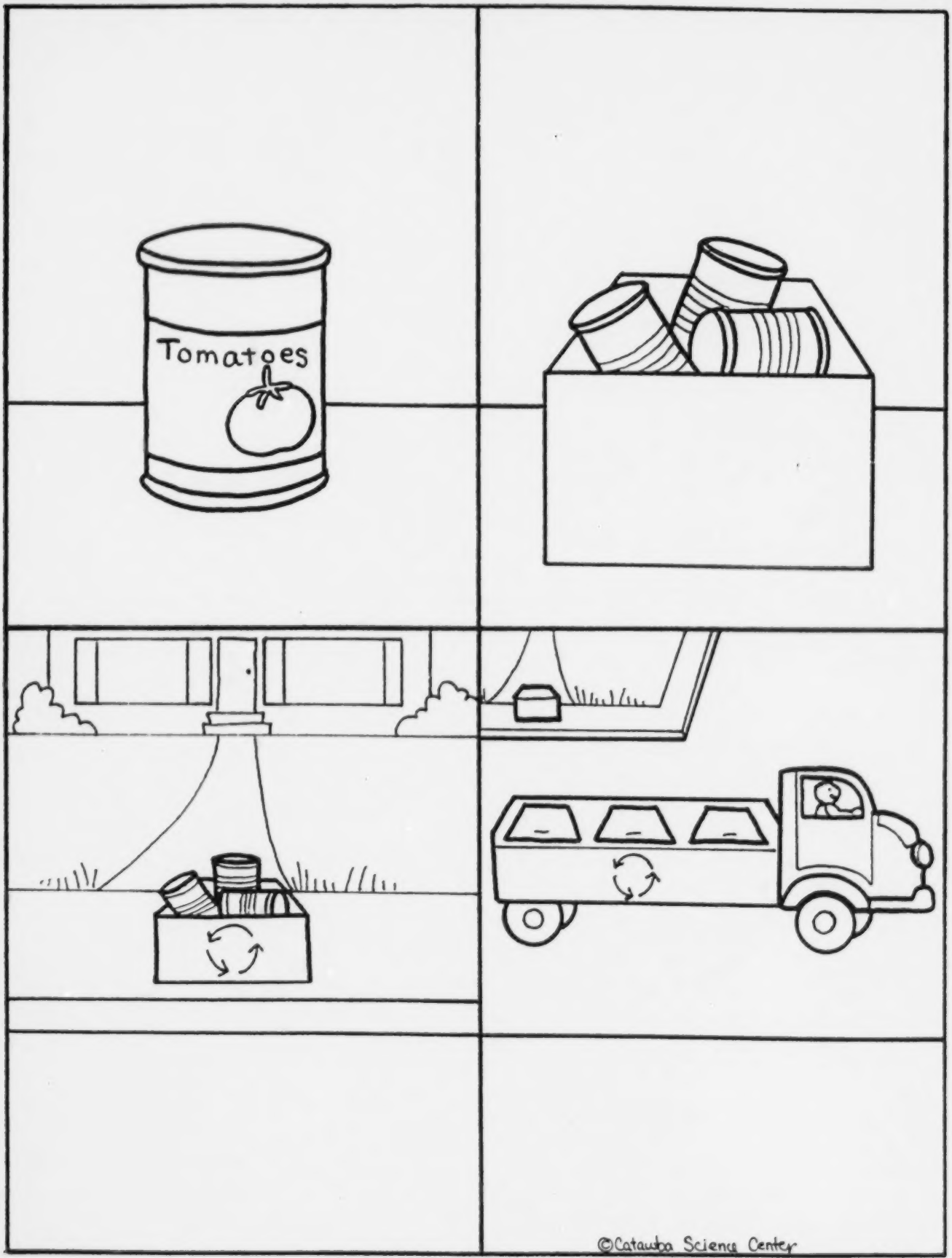
E 344



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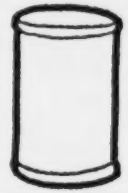
E 345

boxes	cans 	bottles

E348

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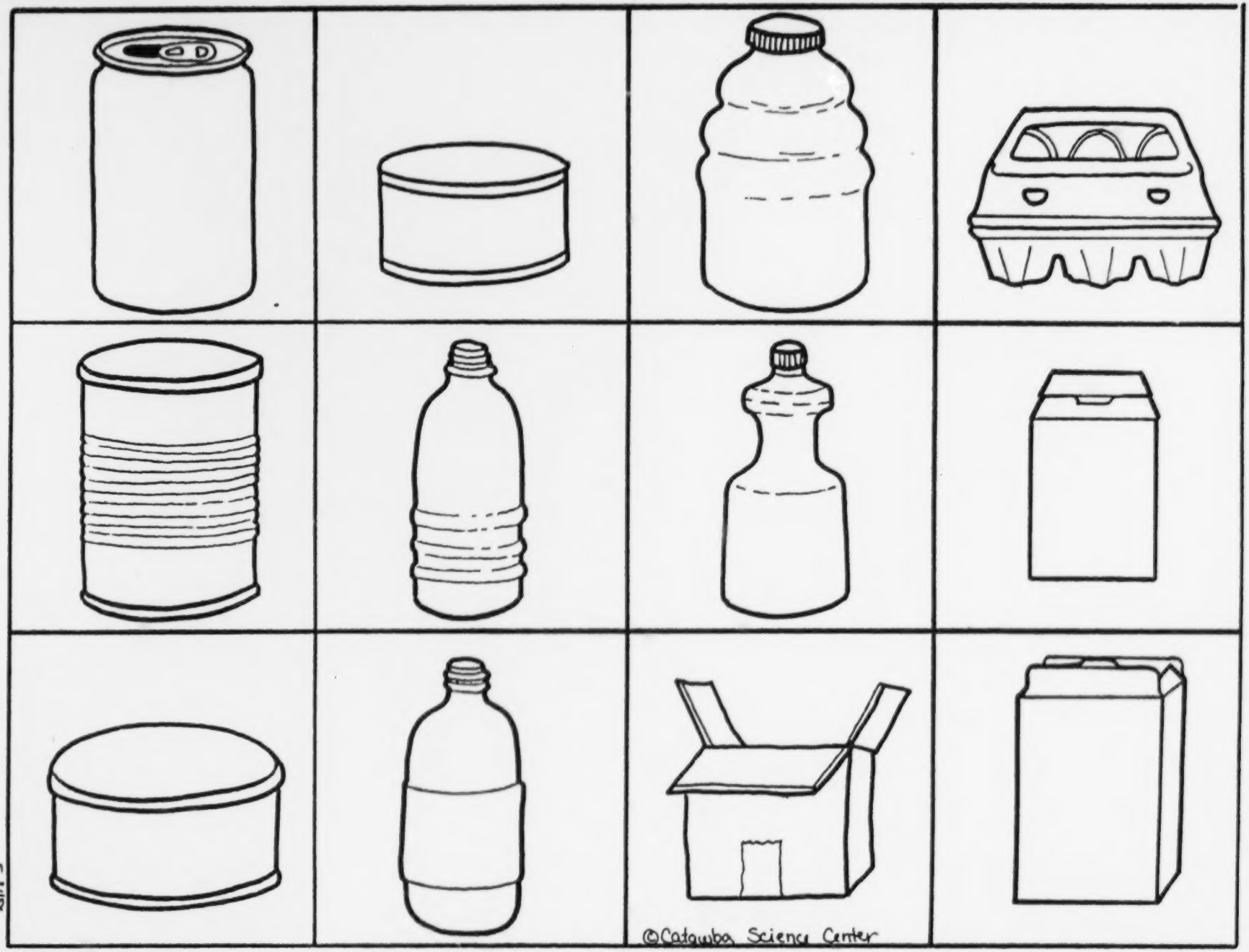

E348

Earth Science

Teacher Resource Activities

Three-Year-Olds

EARTH SCIENCE
RESOURCE KIT
Three Year Olds

Session 1: Air moves things.

1. Let children explore with bubbles and bubble wands. See if children can make bubbles by moving the wand in the air, holding it still in the wind, or blowing on the bubbles. Remind children that the air is moving the bubbles up into the sky and away.

2. Use the canopy for children to explore movement of the air by having them move the canopy through the air slowly and then quickly. Also let children throw the canopy in the air to see how it floats down. Take the canopy outside to see how it moves on a windy day.

3. Put the gliders together and encourage children to send them flying through the air. Talk to children about how the air moves the glider.

4. Let children explore with the pinwheels. Encourage children to blow on the pinwheels to make them move. Remind children that air comes out of our lungs when we blow. See if children can make their pinwheels move by holding them up in the wind or by moving them through the air.

5. Use one copy of each of the patterns numbered E315. Color the pictures that tell the story Who Took the Farmer's Hat? Laminate and back these pieces with sandpaper or Velcro to use on the flannel board. The pictures can also be transferred onto Pellon to make flannel board pieces. As an alternate to flannel board pieces, the story characters can also be made into stick puppets by attaching tongue depressors to them.

6. Use one copy of each of the patterns numbered E316. Color and put together the book Air Moves Things. Place the book in your book center and read it to the children.

7. Make an air box using a small plastic bowl. Cut a hole the size of the battery operated fan in the bowl lid. Insert the fan and secure with tape or glue. Put a different material in the box each day. Snap on the lid. Turn on the fan. Watch what happens. On some days put in materials that air will not move (pennies) and on other days put in materials that air will move (paper confetti, sequins, feathers, cotton balls, etc.).

8. Make a windsock. Have each child decorate a piece of 12" x 18" sheet of paper. Fold paper to form a cylinder and tape together. Let children attach streamers of crepe paper to one end of the cylinder. Punch three holes, equal distances apart, in the other end of the cylinder. Cut three pieces of string 12 inches long. Attach a string to each hole and tie the pieces of string all together at the top. Hang windsock and let children observe how the air makes it move.

9. Make a flag. Give each child a sheet of construction paper to decorate as their flag. When finished, attach a stick or dowel to each paper with tape or glue. To make smaller flags, cut the construction paper into four equal rectangles. Let children decorate. Attach drinking straws, instead of sticks, to the flags.

Session 2: Water has special characteristics.

1. Set up a water table (or use a large plastic tub) both indoors and outside. Let children explore with the water play kit. Remind children that water flows and that some things float in it.

2. Use one copy of each of the patterns numbered E322. Laminate the maze patterns and let children trace the flow of the water through the maze.

3. Use two copies of each of the patterns numbered E323. Color the pipes and cut out into pieces. Let children build a pipe system with the curved and straight pipes. Ask children to show you where the water would flow. Encourage children to change the flow of the water by changing the positions of some of the pieces of pipe.

4. Use one copy of the pattern E324. Color and cut out the water pumping sequence cards. Ask children to put the pictures in order. Remind children how the water flows from the pump.

5. Use one copy of the pattern E325. Color the picture showing things that sink or float in the water. Cut apart the picture to make a puzzle.

Session 3: Rocks, dirt, and sand.

1. Let children use a rock assortment to sort and match rocks by size, color, weight, or texture.

2. Place a pair of goggles and a geologist hat in a center for the children to pretend play. Encourage them to hunt for rocks. Use the goggles and hat outside and have children dig and sort rocks.

3. Place magnifiers out with the rock assortment so children can examine the rocks.

4. Use one copy of each of the patterns numbered E334. Color and put together the book I Like Rocks. Read the book to the children and place in the book center. Talk to children about what is happening in each picture. Let children try some of these things in the classroom or out on the playground.

5. Use one copy of the pattern numbered E335. Color and cut out the rock sifting sequence cards. Ask children to put them in order.

Session 4: Recycling keeps the environment clean.

1. Use one copy of each of the patterns numbered E341. Color the lotto boards showing the littered scene and the cleaned-up scene. Be sure that the items that appear in both sets are colored the same. Cut out the cards showing the clean scene. Use the littered scene sheet as a lotto board and let children find the clean picture that goes with each littered picture. As you play the game, ask children what needs to be done in each picture to make it clean.

2. Use one copy of the pattern numbered E342. Color and cut out the cards sequencing the recycled glass being made into a new glass product. Ask children to put pictures in order. Remind children why it is important not to throw glass away but, instead, recycle it.

3. Use one copy of the pattern numbered E343. Color and cut out the cards sequencing reusing plastic milk jugs to make a bird feeder. Ask children to put these in order. Tell children that sometimes we can reuse things instead of just throwing them away.

4. Use one copy of the pattern numbered E344. Color and cut out the cards sequencing how we can reduce the amount of trash by using cloth grocery bags instead of plastic or paper. Ask children to put the cards in order. Remind children that if we do use plastic or paper grocery bags they can be returned to the grocery store for recycling.

5. Use one copy of the pattern numbered E345. Color and cut out the pictures sequencing recyclables being taken out to the recycling truck. Ask children to put the cards in order. Ask children what the recycling truck does with all the recyclable materials it collects.

6. Provide an assortment of recyclables for children to sort. Be sure to include plastic, newspaper, magazines, metal cans, and glass (use only if proper safety precautions are taken).

7. Provide a variety of "trash" and recyclables and let children create their own sculptures with tape and glue. Include paper towel rolls, newspaper, cardboard, plastic bottles, plastic soda can ring holders, foil, boxes, etc.

8. Use one copy of each pattern numbered E348. Leave whole the sheet with the sorting board labeled boxes, cans, and bottles. Cut apart the other sheet. Children sort the cards according to the categories on the sorting board.

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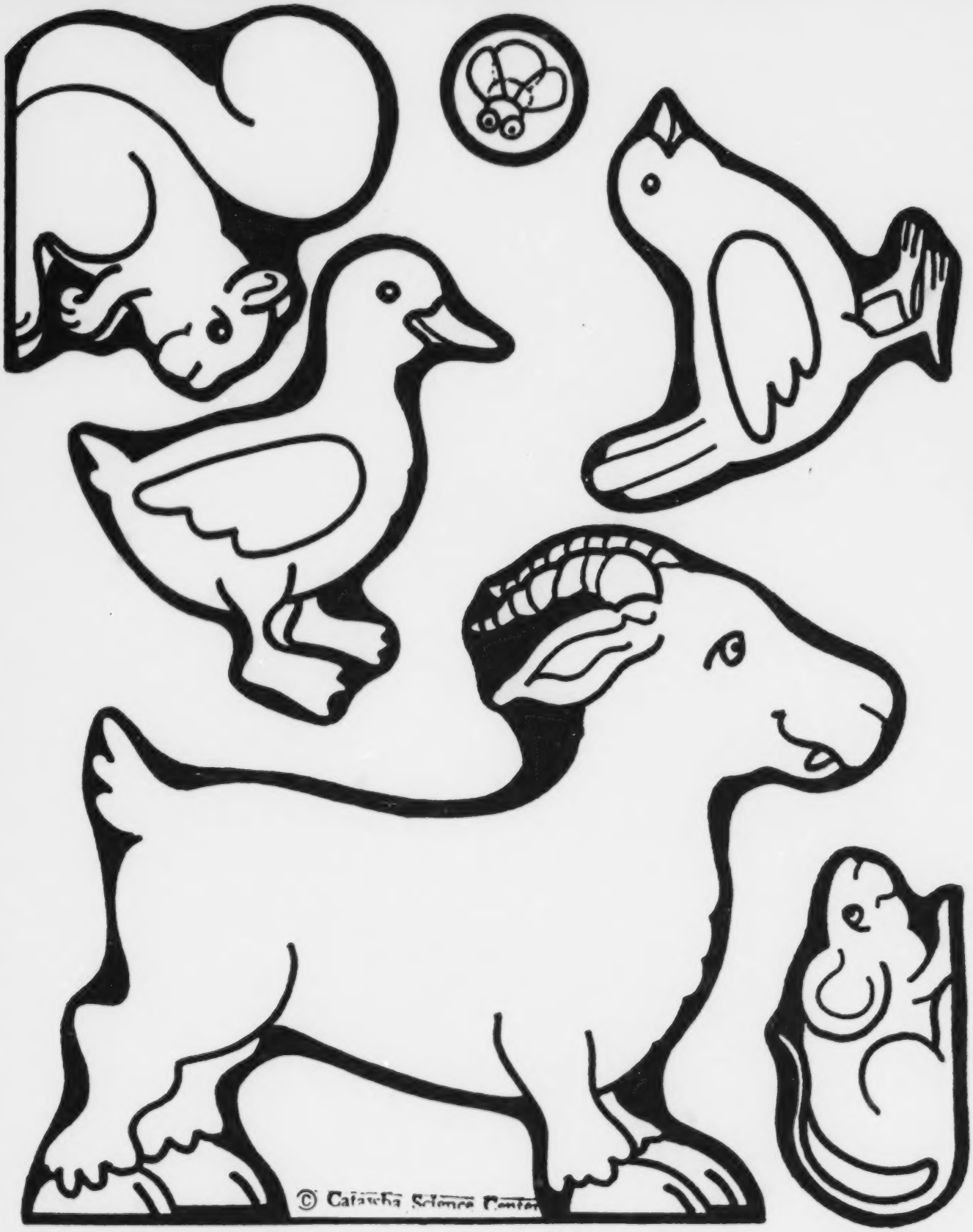

E315

Air
Moves
Things

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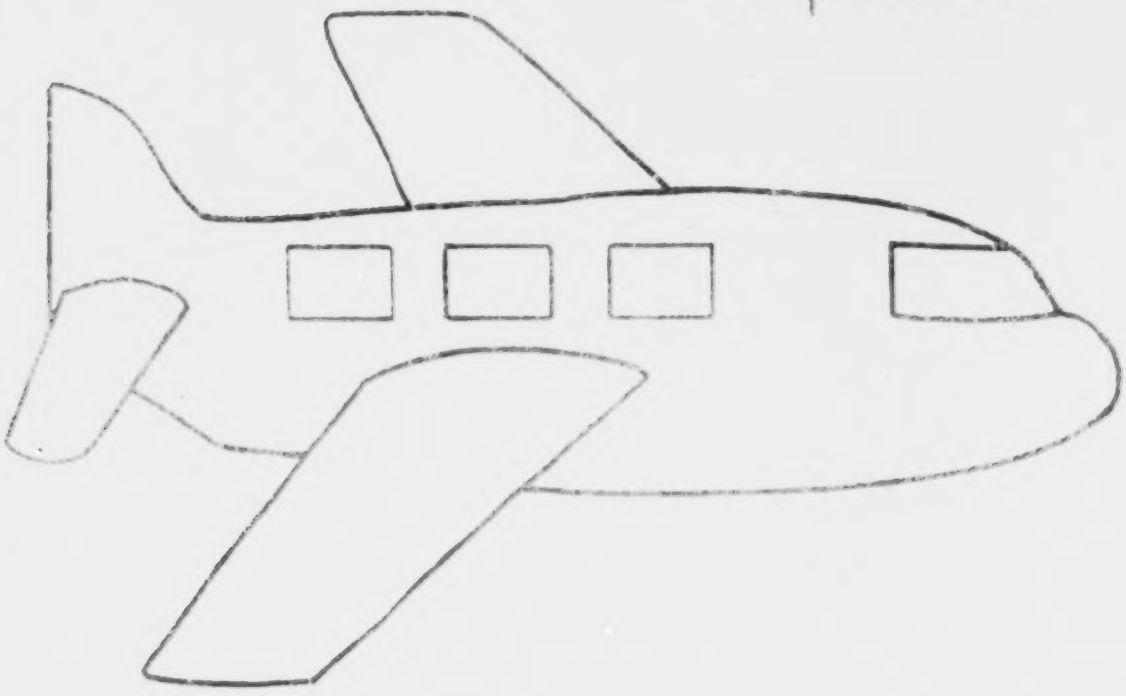
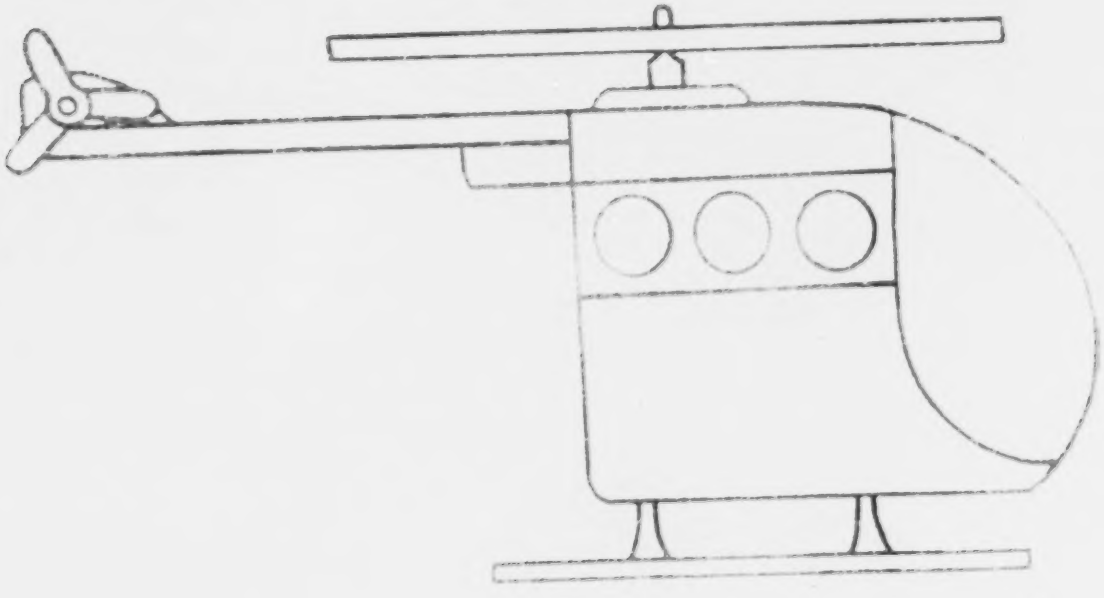
The End

E316

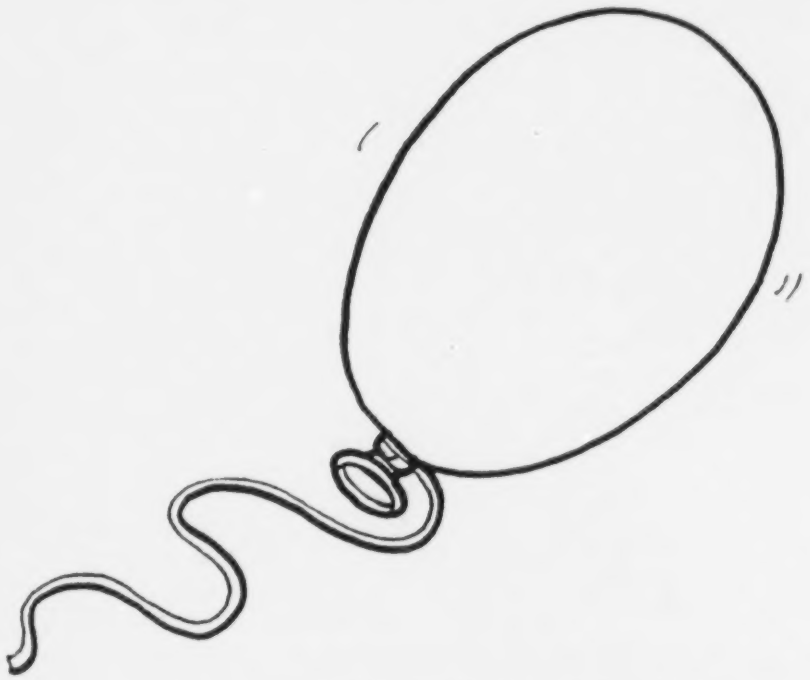
airplane



helicopter



balloon



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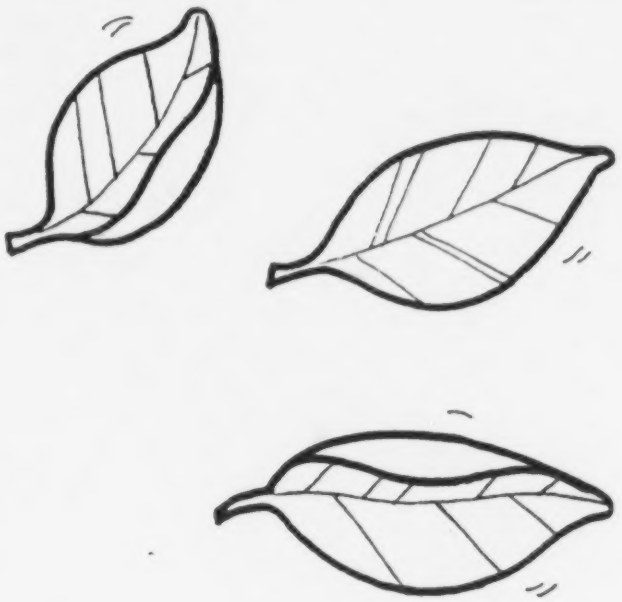
leaves



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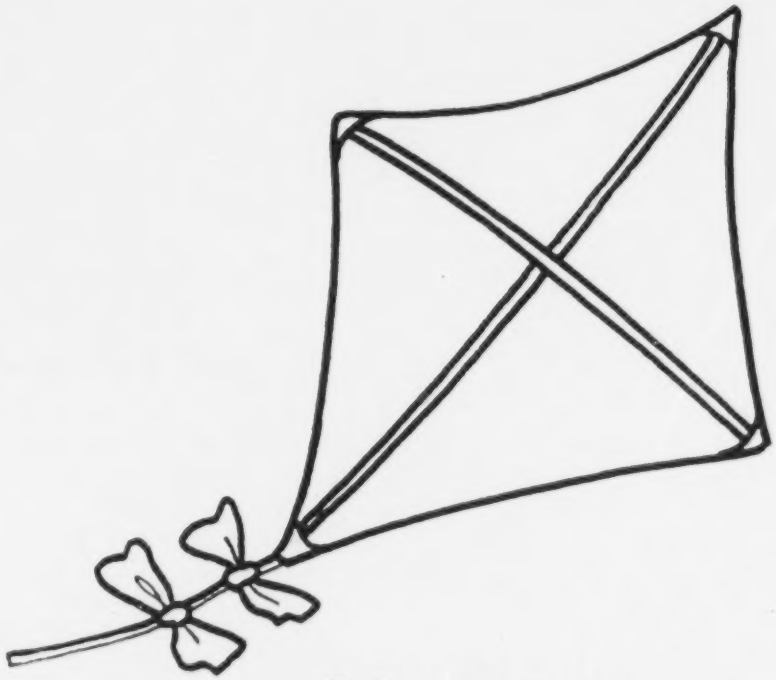
E316

kite



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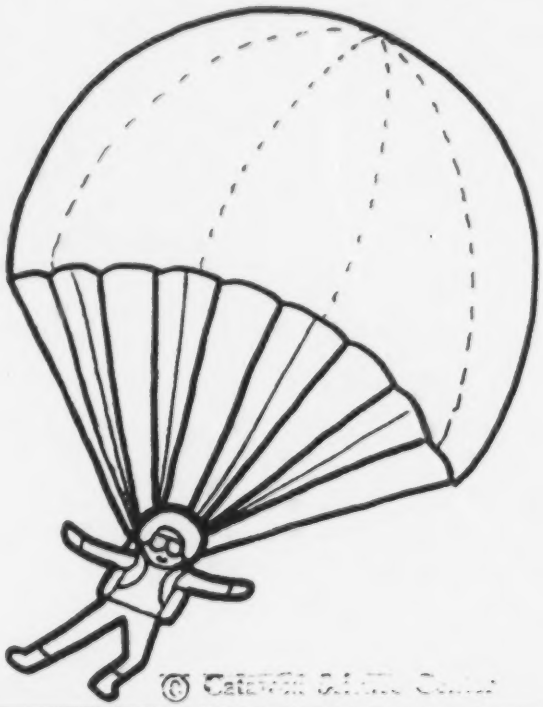
parachute



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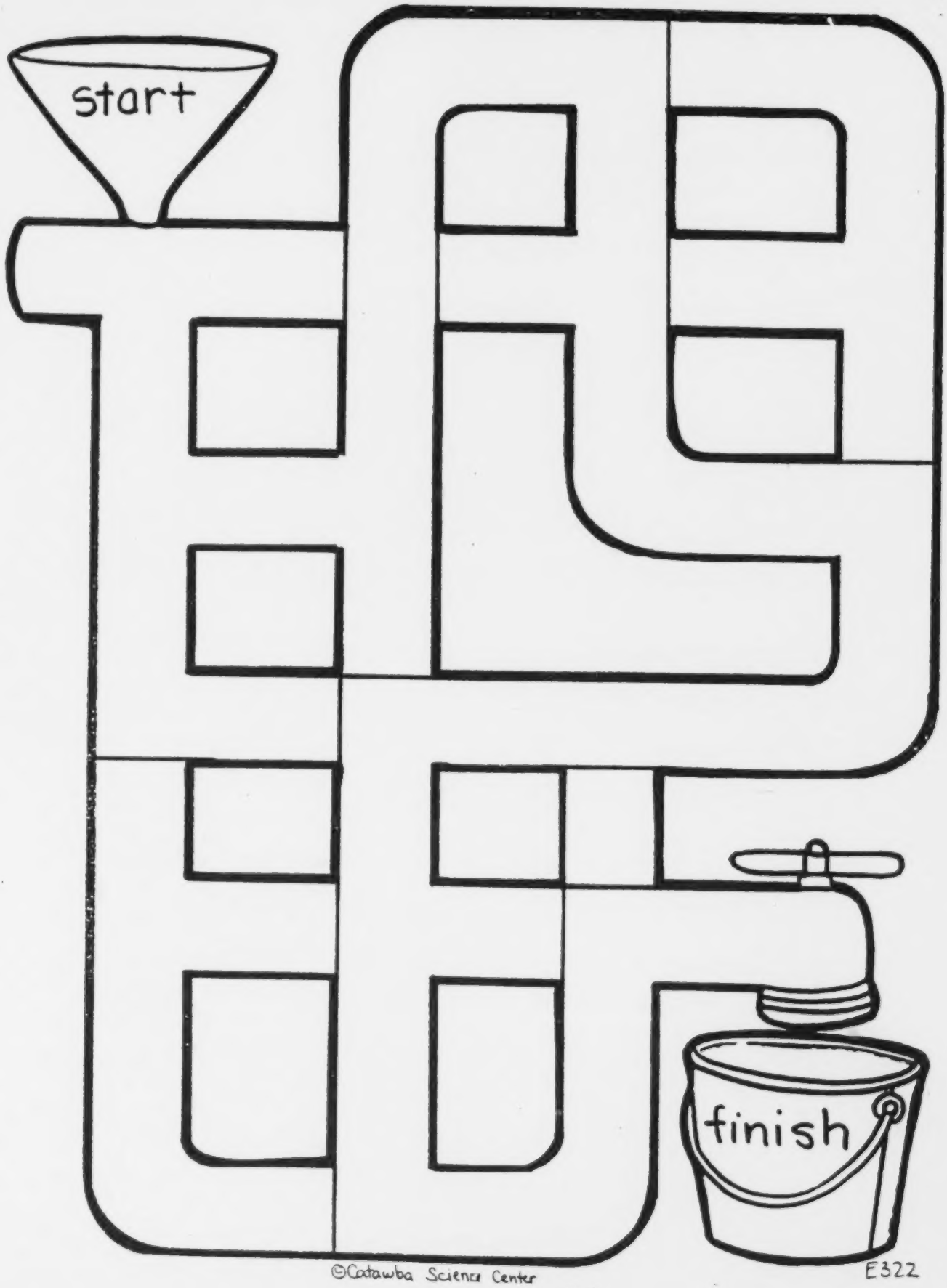

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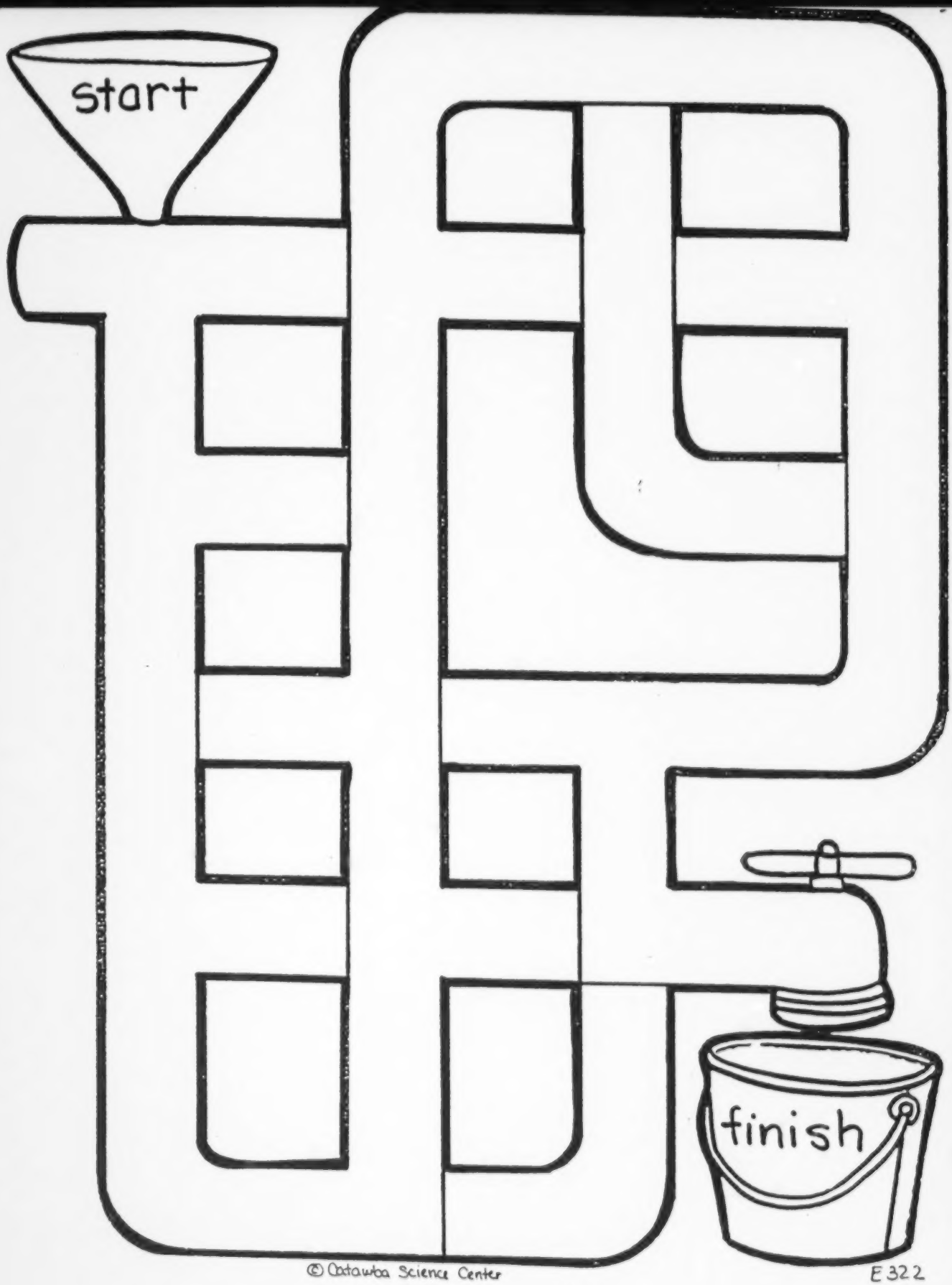

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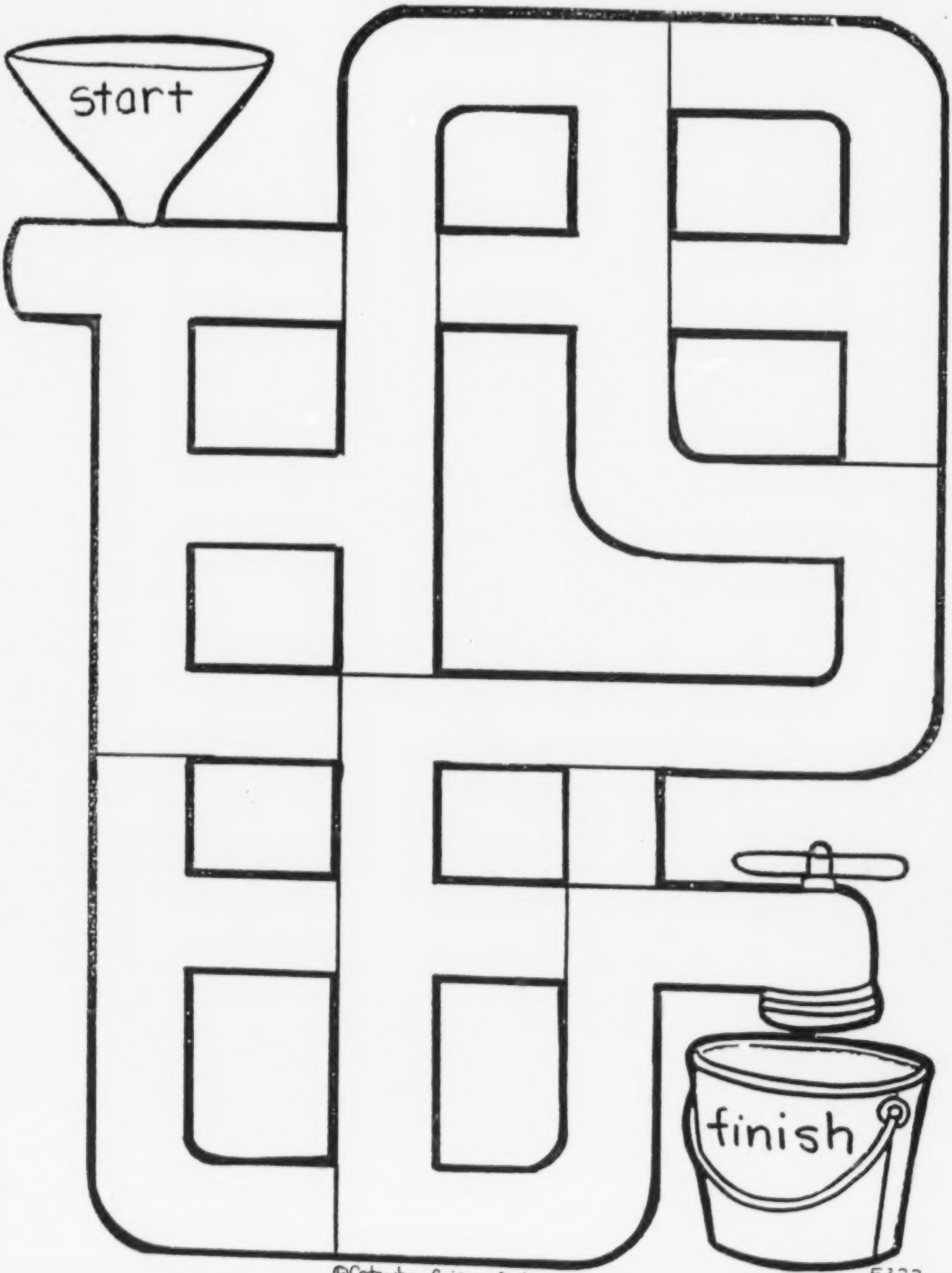

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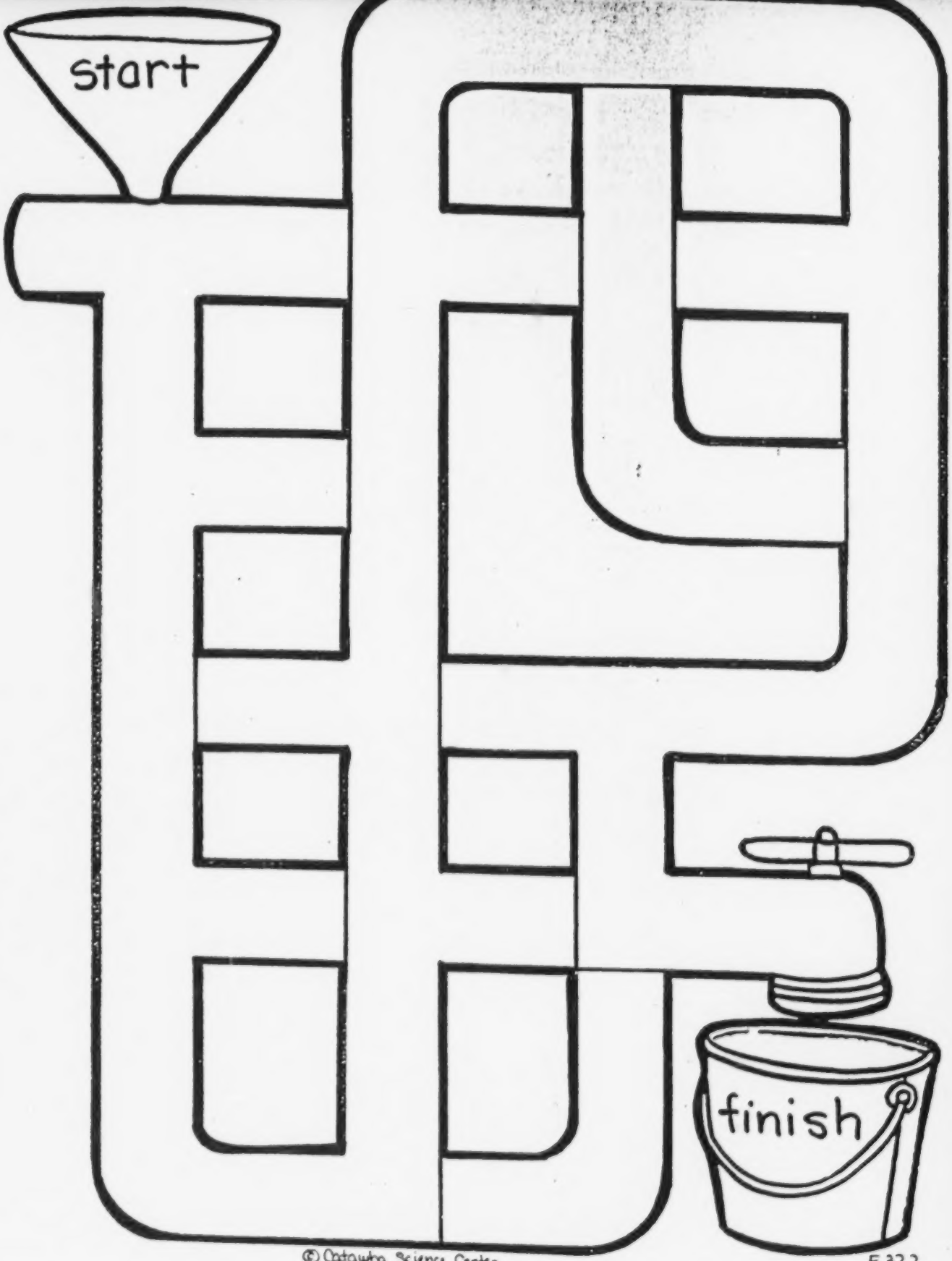

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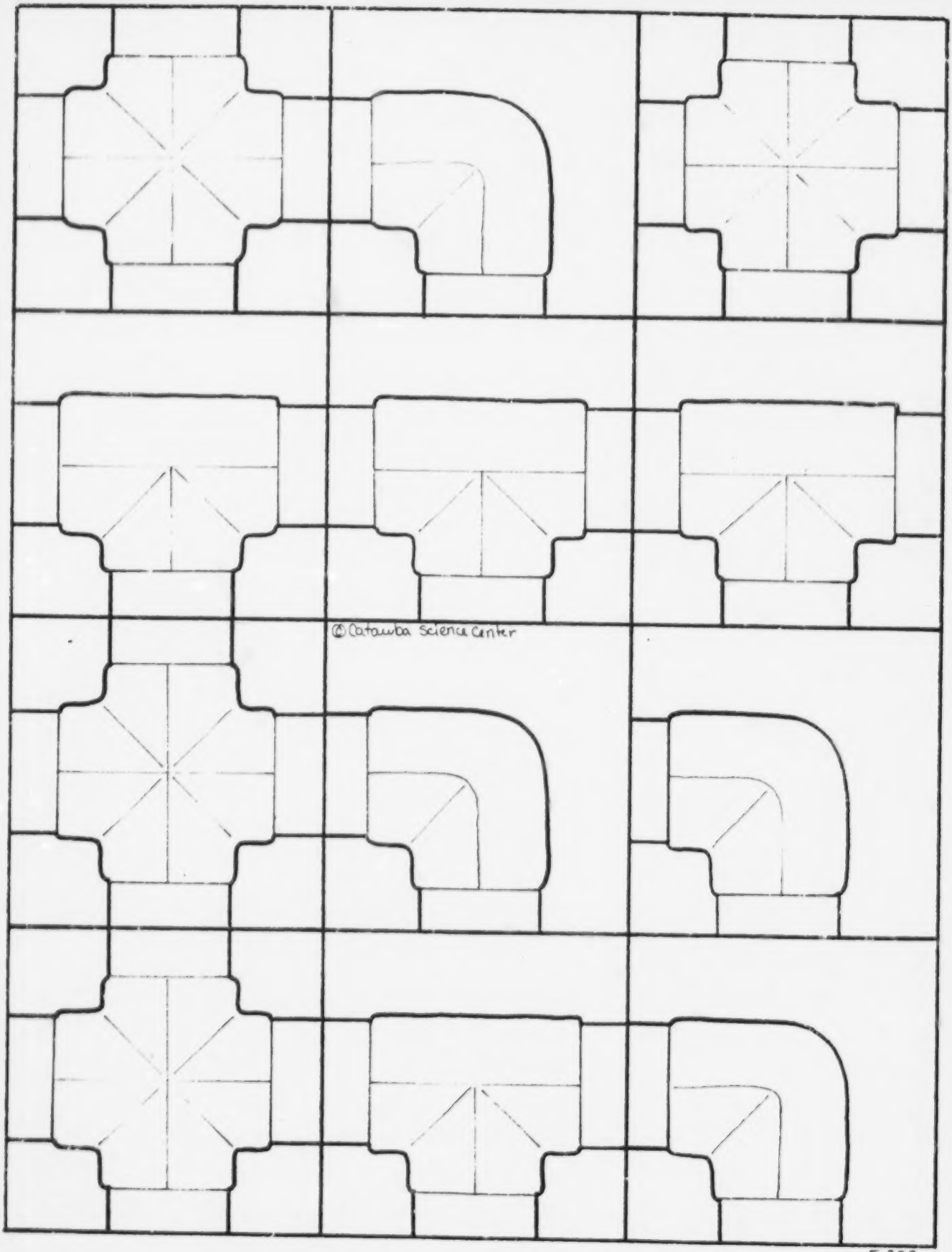
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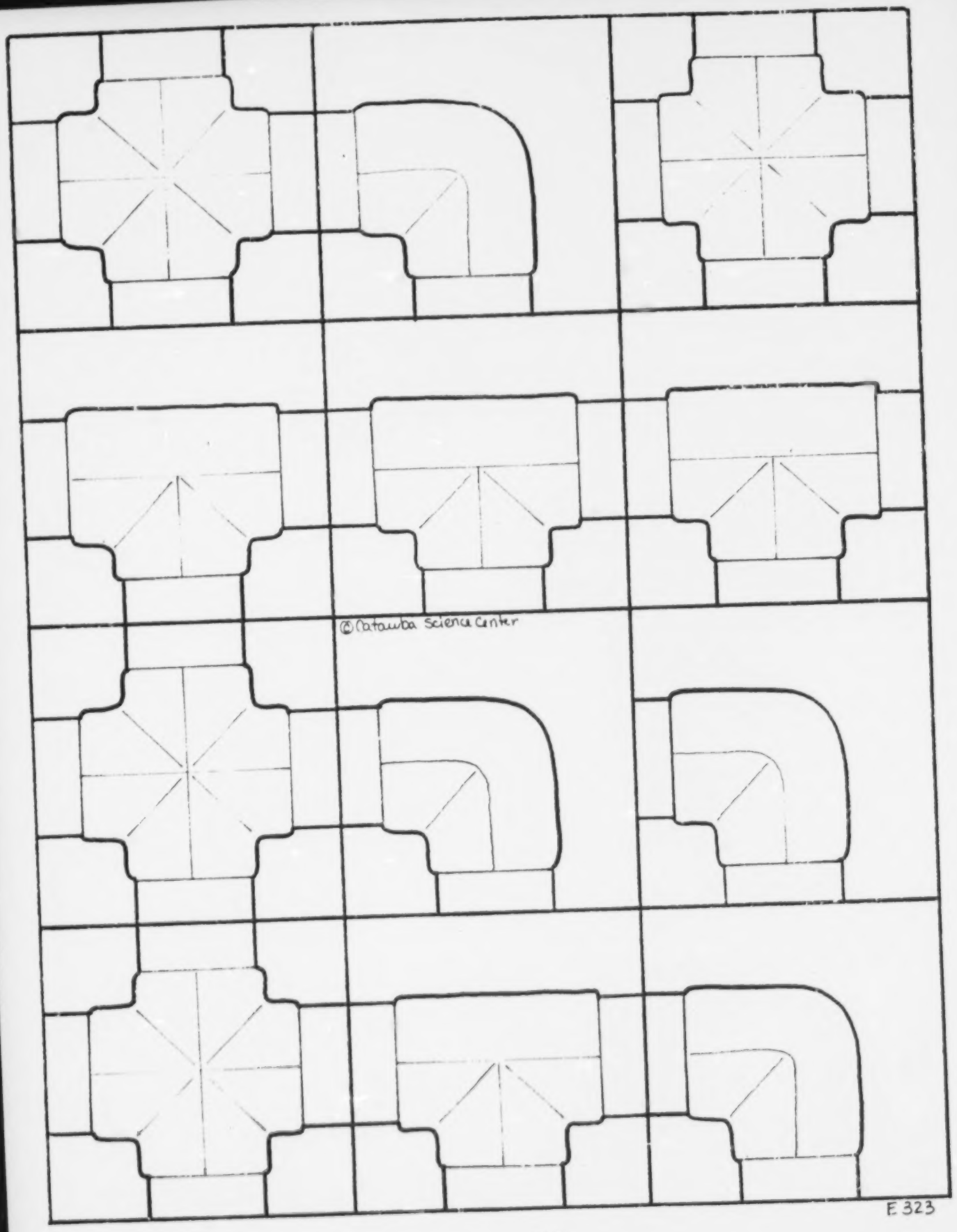
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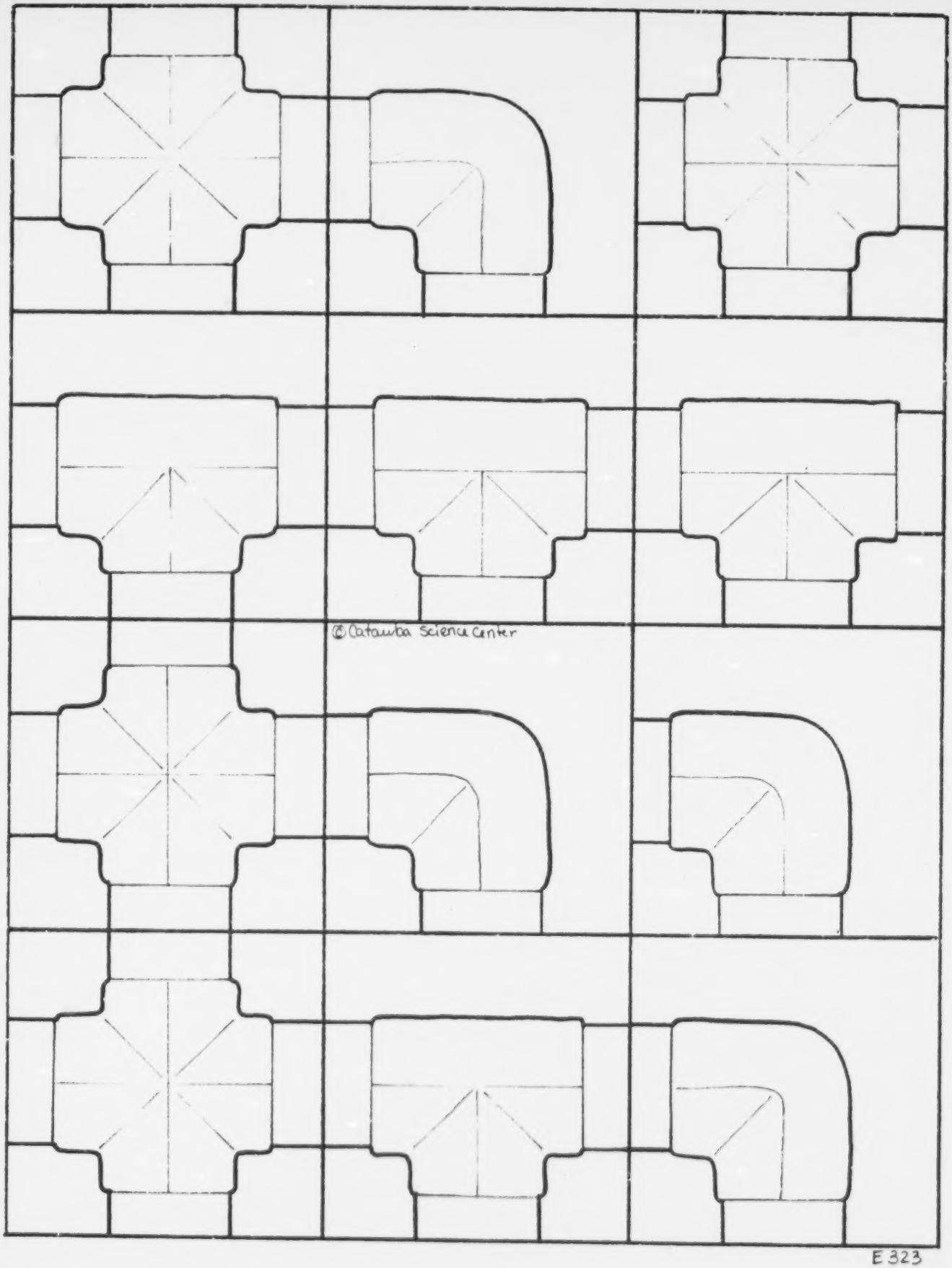
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E 323

E 323

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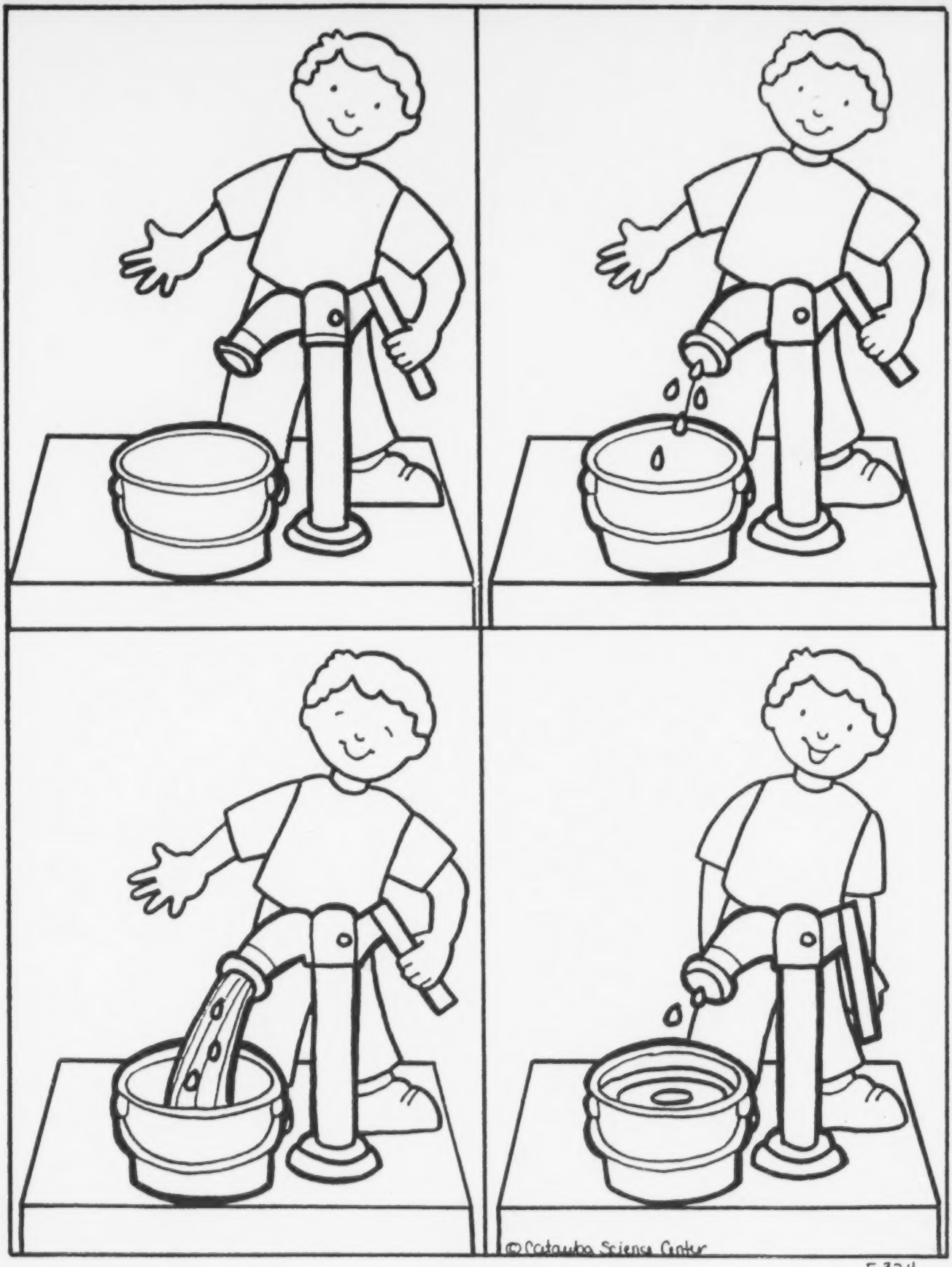

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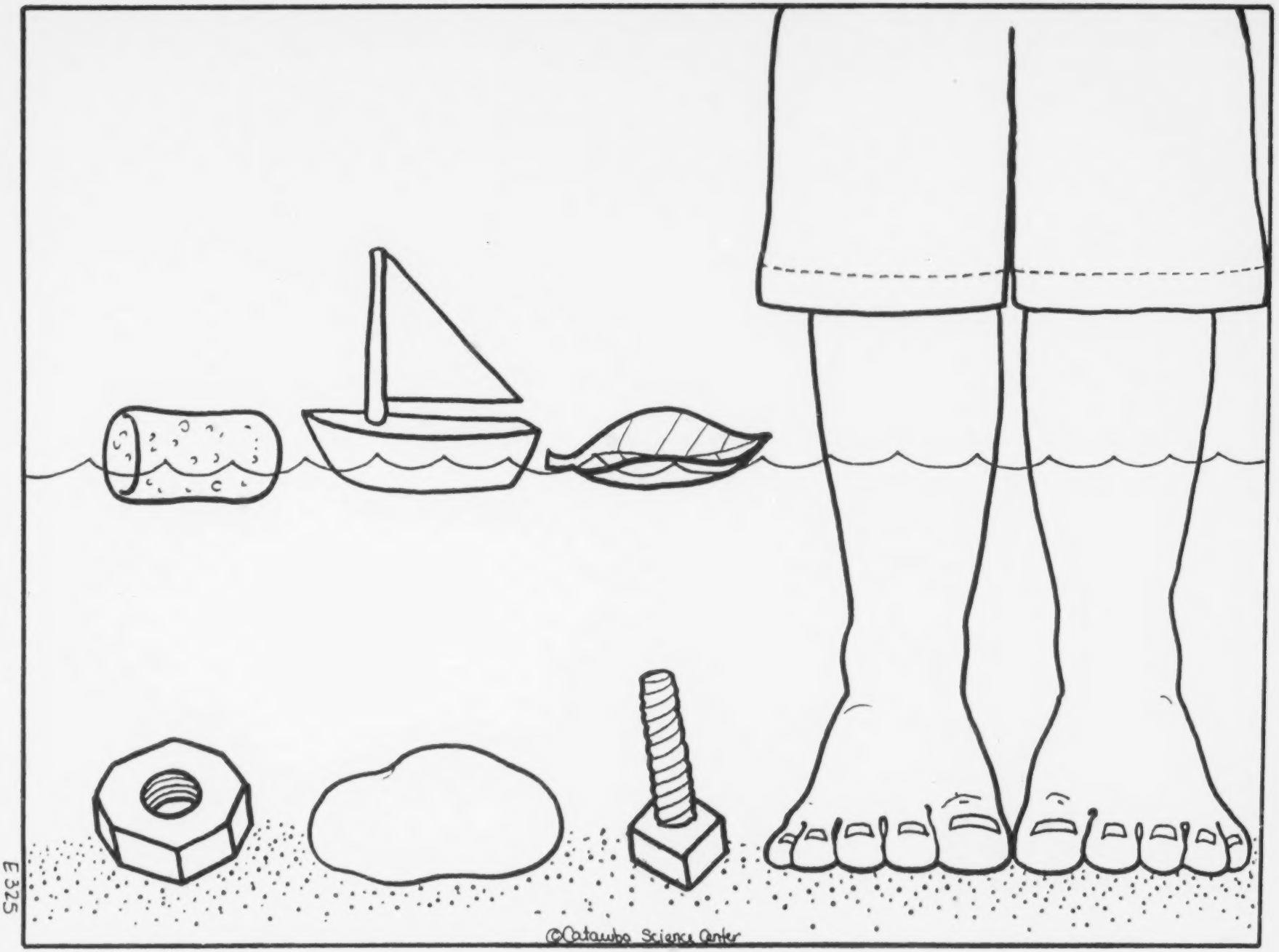
E 325
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I
Like
Rocks

© Catawba Science Center

I love rocks.

E334

Big rocks.

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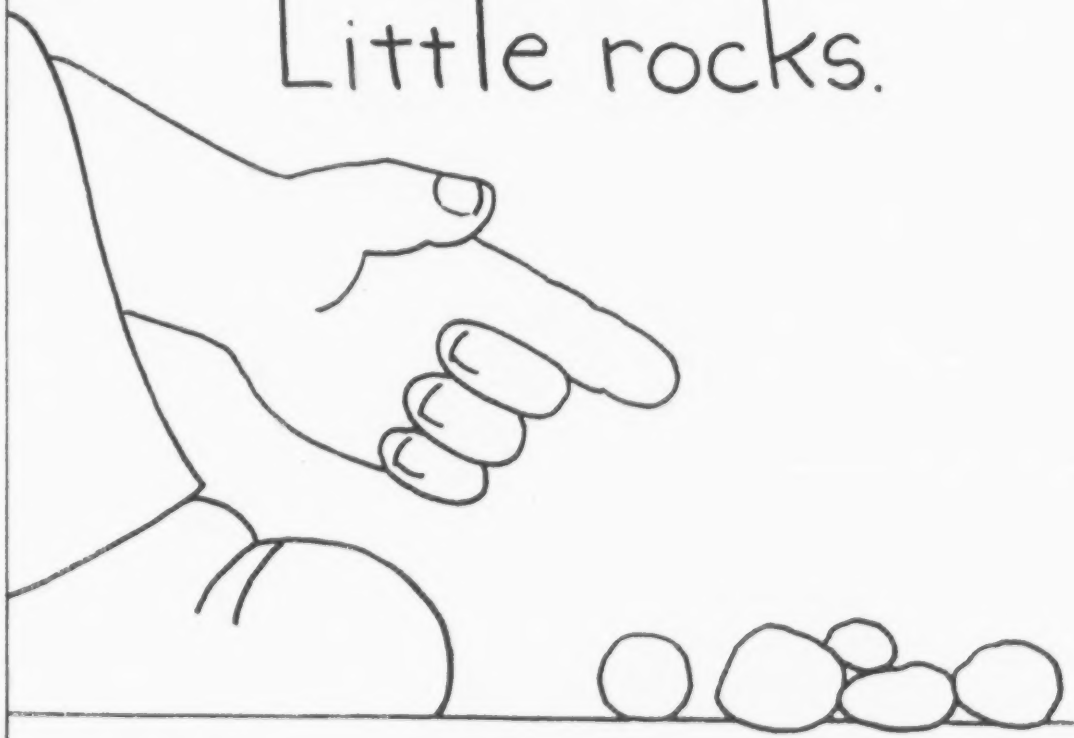
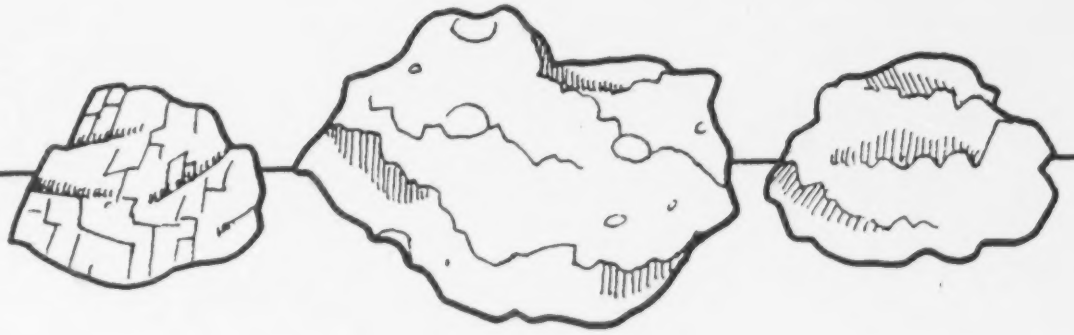
Little rocks.



E 334

Rough rocks.



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Smooth rocks.

E334

Digging for rocks.

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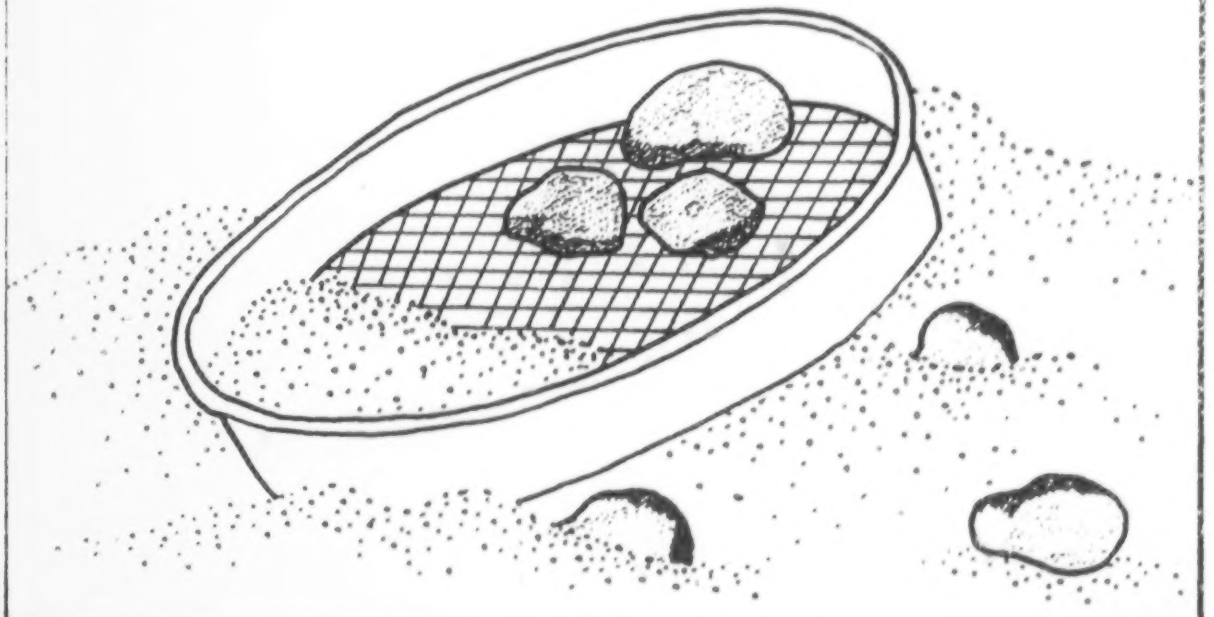
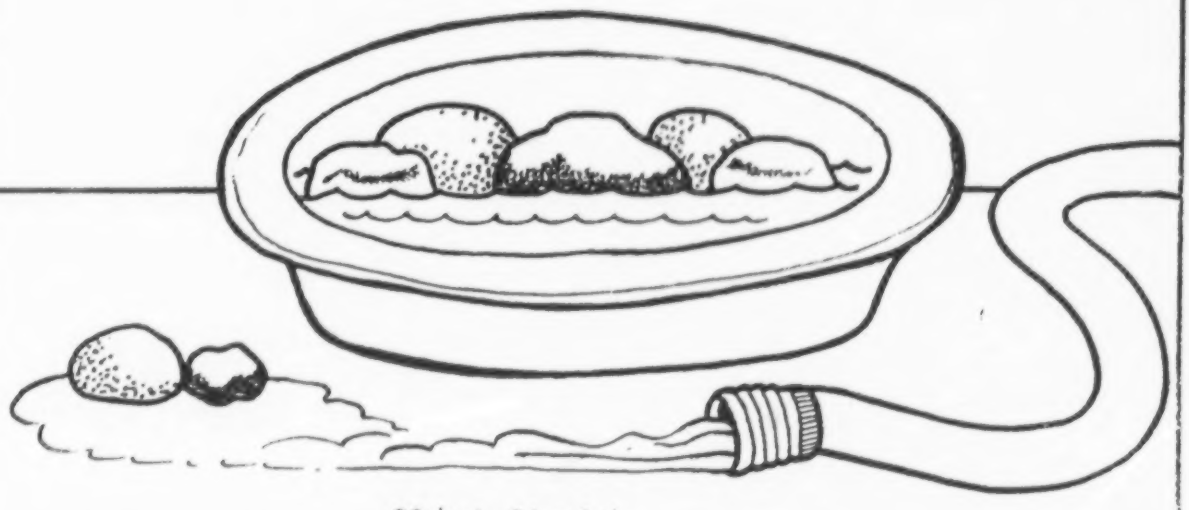
Sifting for rocks.



E334

Washing rocks.



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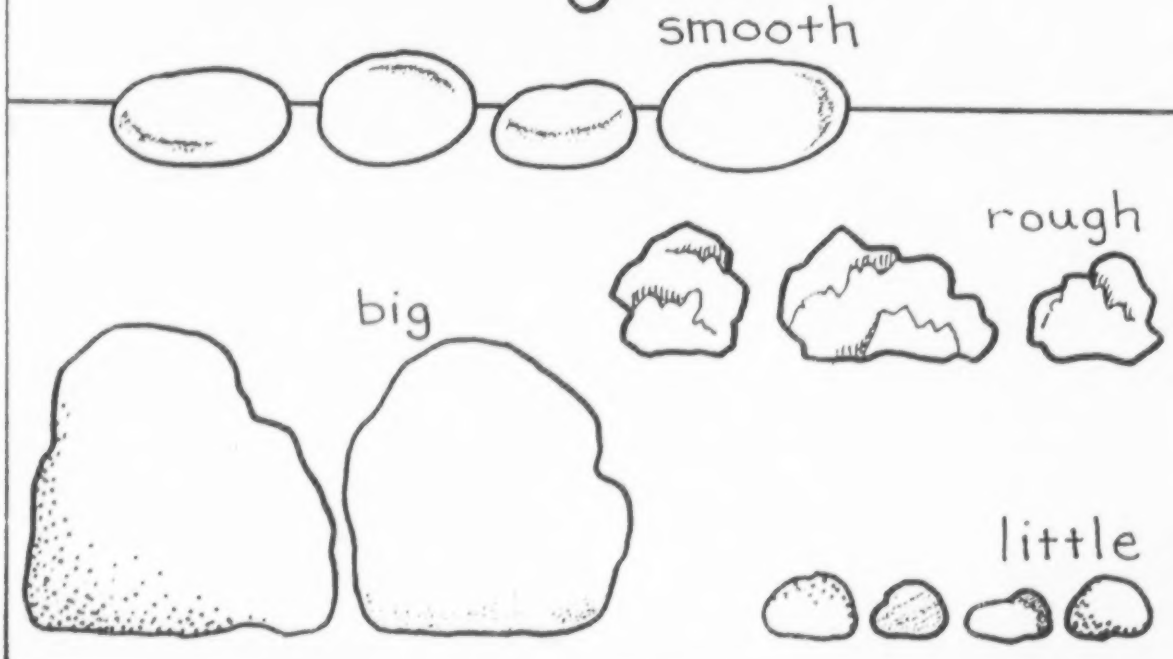
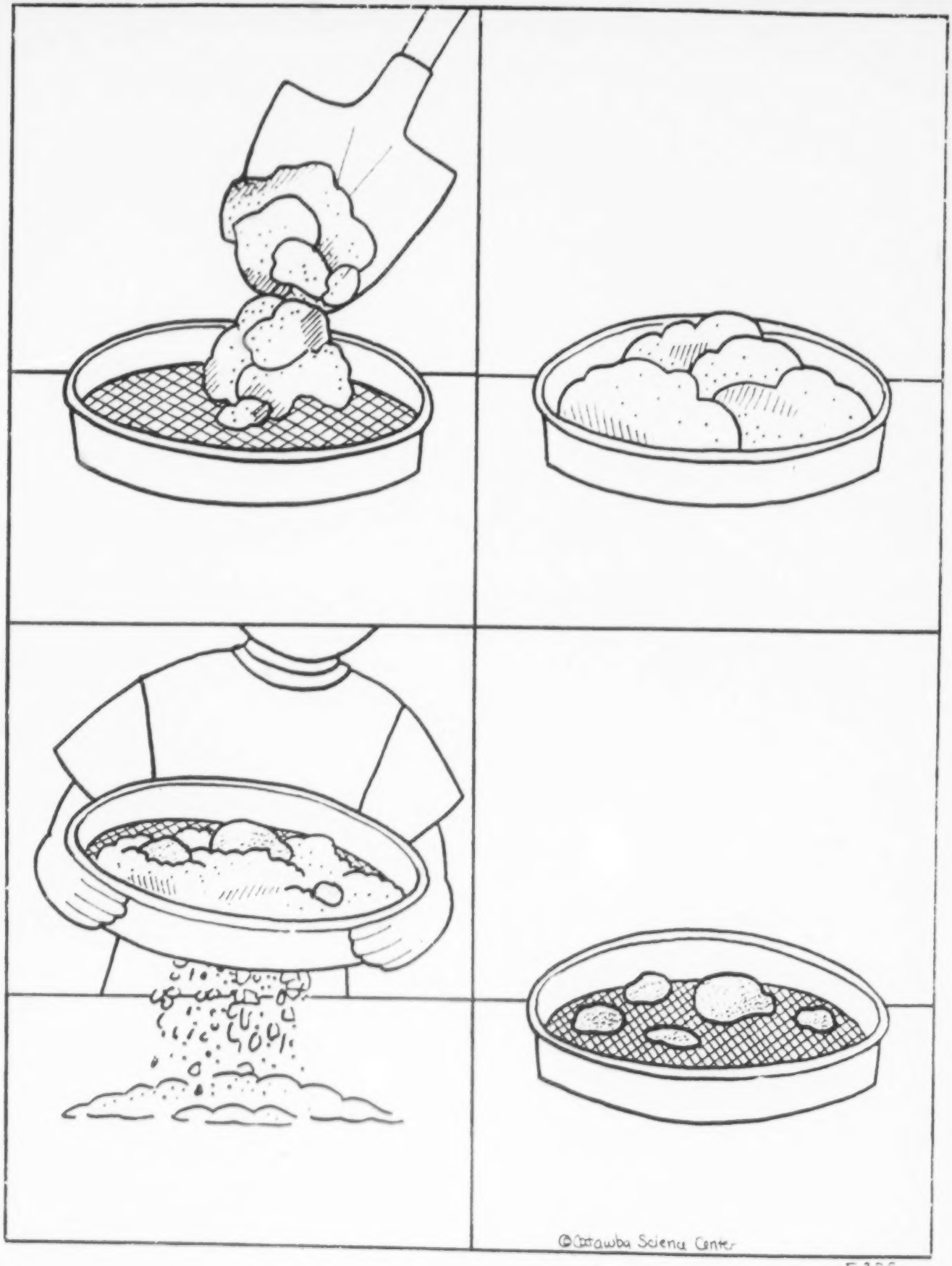
Sorting rocks.



E 334



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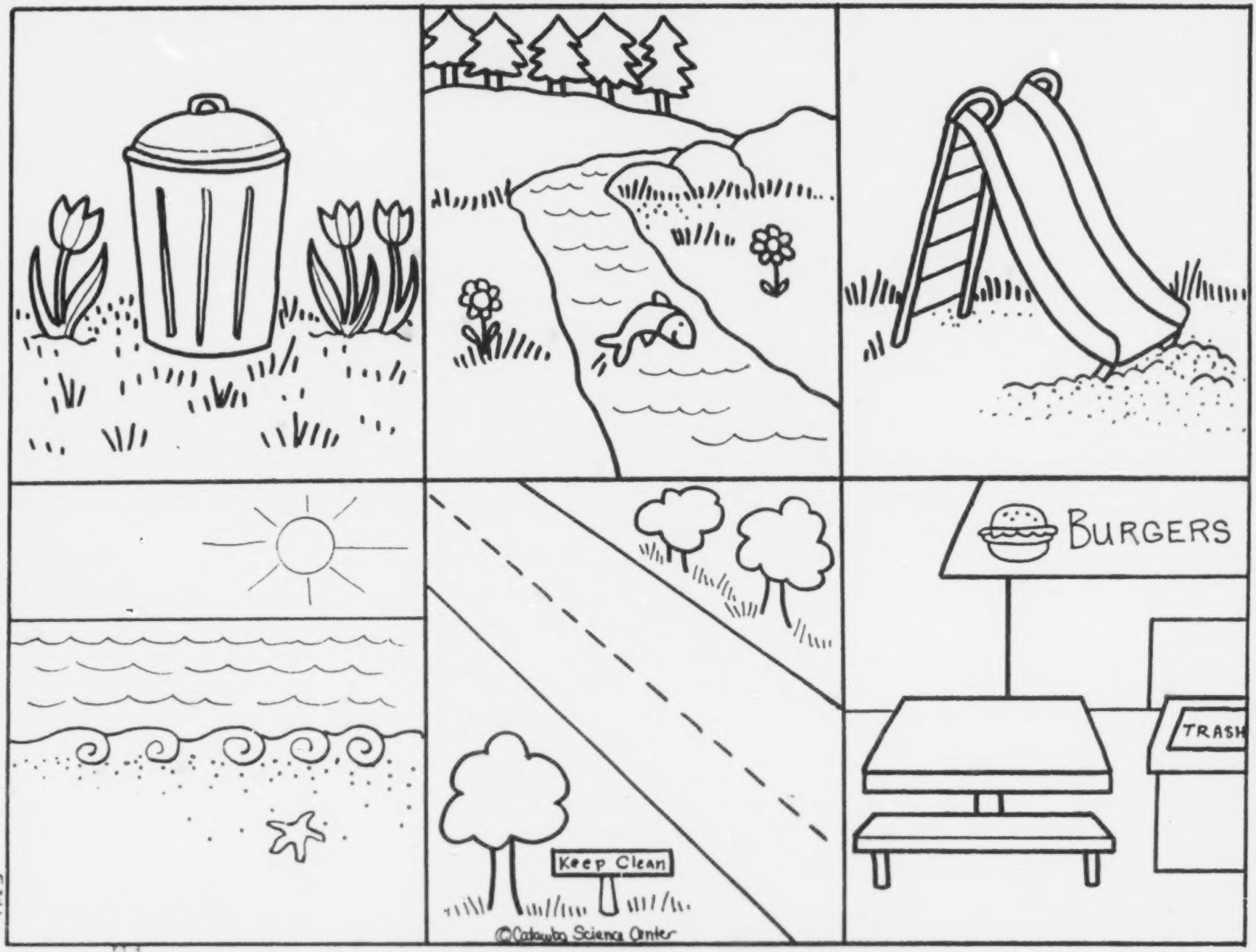

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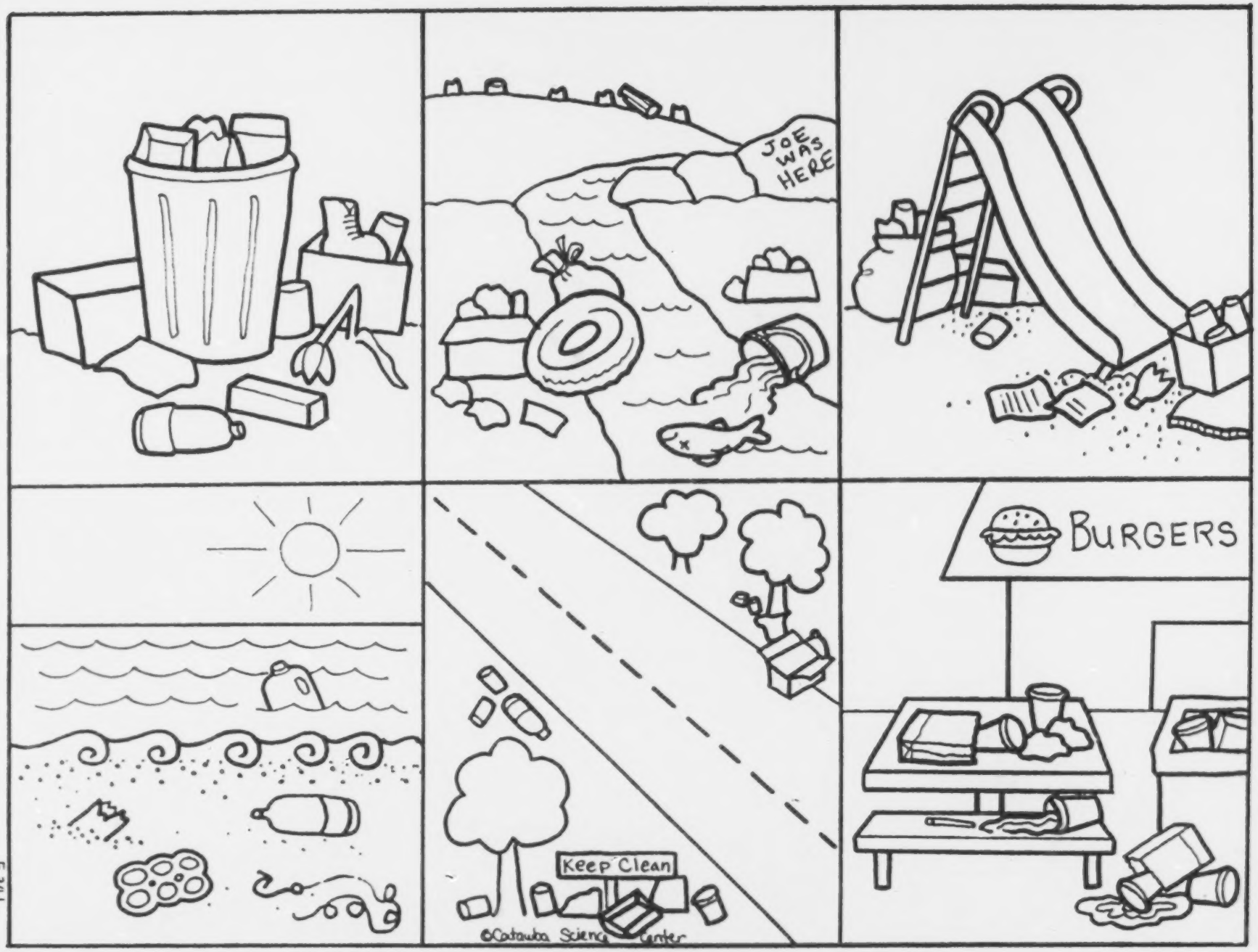

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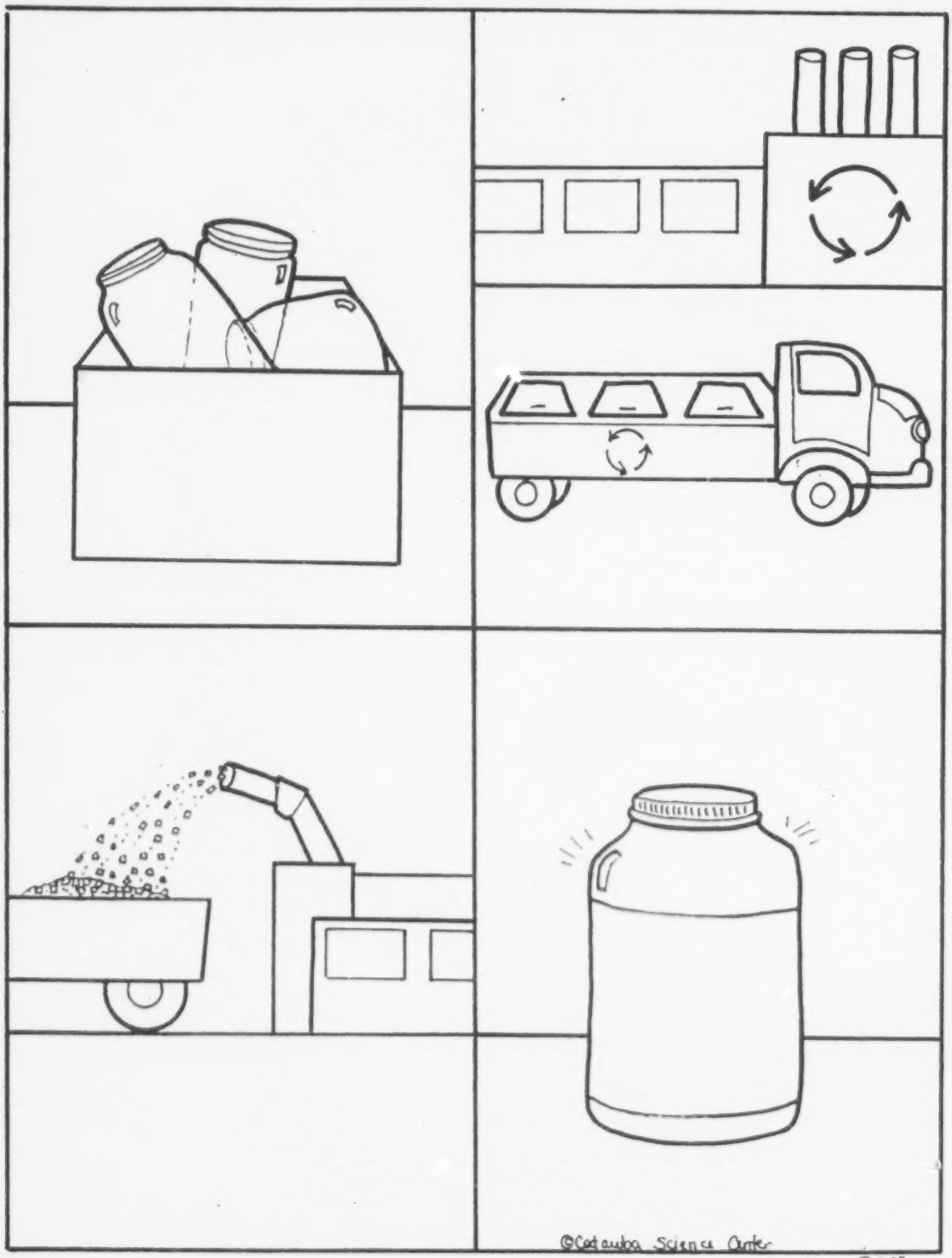

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E 342

MILK
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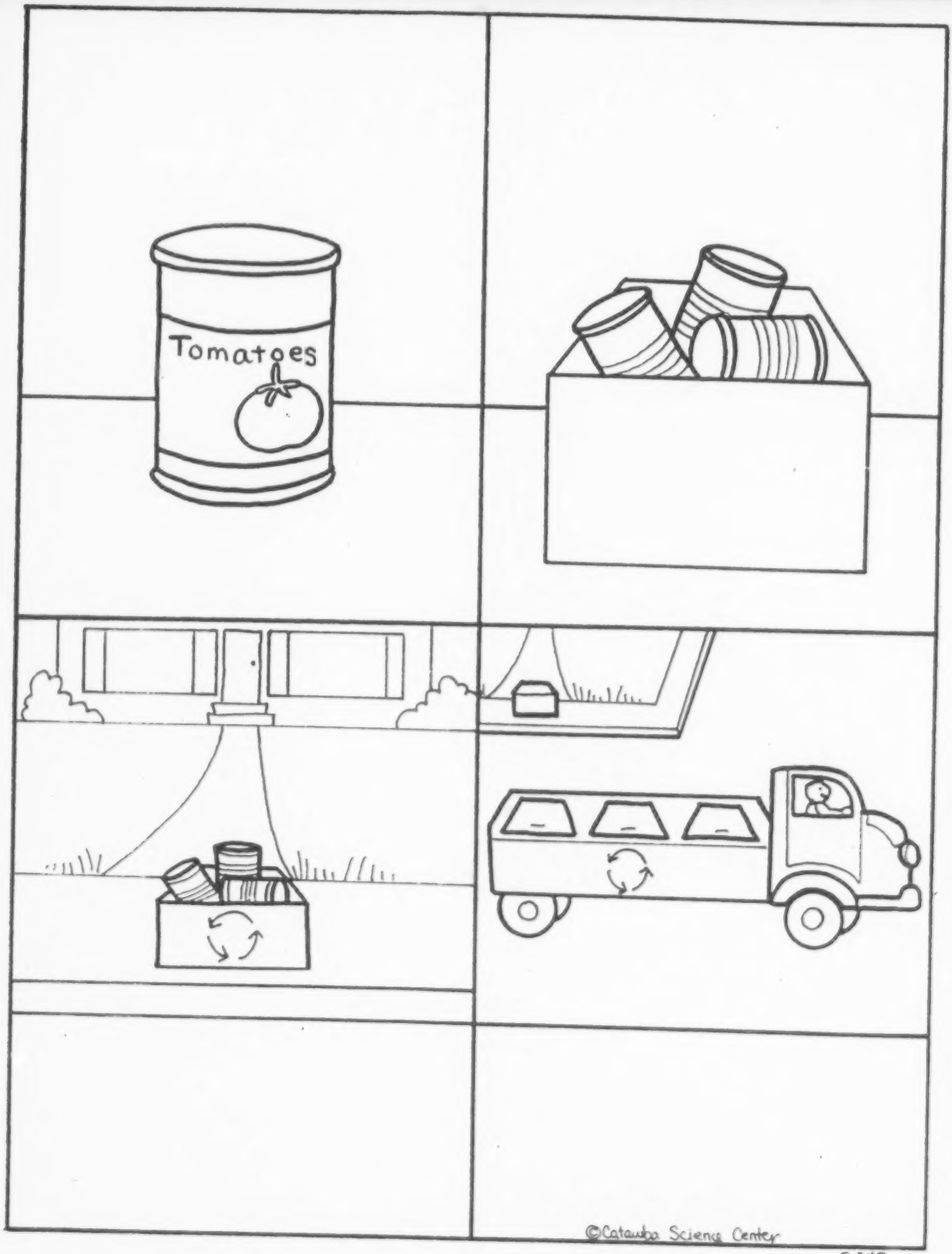
E 343

Speedy Mart
CHECK-OUT
$
©Catawba Science Center
E 344


Tomatoes
©Catawba Science Center
E 345

boxes	cans	bottles

E348

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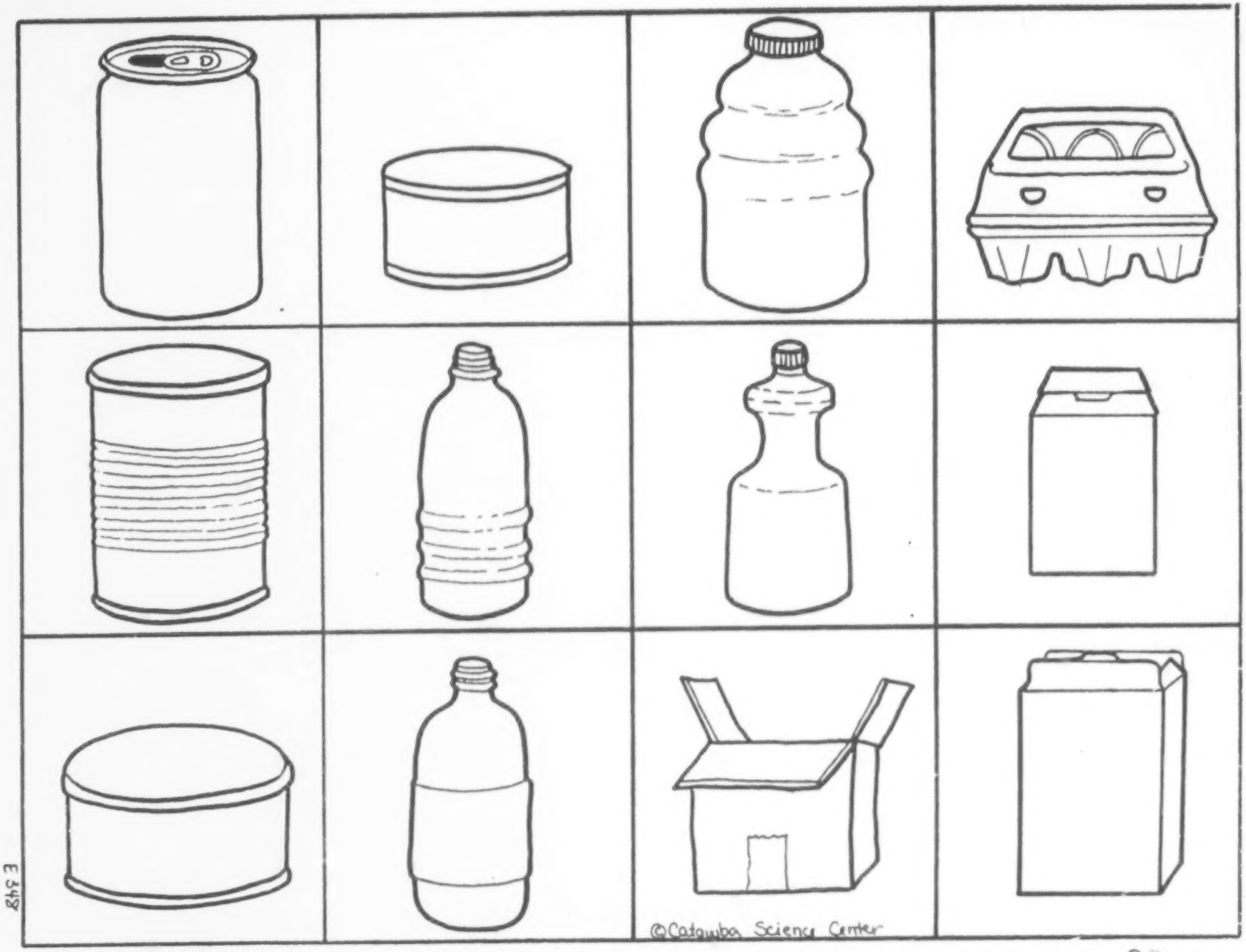

E348

91

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Earth Science

Books and Fingerplays

Three-Year-Olds
Four-Year-Olds

Earth
Books

Water written by Alfred Leutscher

Water written by Angela Webb

Snow Is Falling written by Frankly M. Branley

Floating and Sinking written by Franklyn M. Branley

Dinosaur Bones written by Aliki

My Visit to the Dinosaurs written by Aliki

Fossils written by Allan Roberts

Air is all around you written by Frankly M. Branley

The Wind Is Air written by Mary Brewer

Air written by Angela Webb

Volcanoes written by Seymour Simon

A First Look at Rocks written by Joyce Hunt and Millicent E. Selsam

Rocks and Minerals written by Illa Podendorf

Earth written by Alfred Leutscher

Soil written by Angela Webb

If You Are A Hunter of Fossils written by Byrd Baylor

I Can Be A Geologist written by Paul P. Sipiera

Everybody Needs A Rock written by Byrd Baylor

Rock Collecting written by Roma Gans

Rocks in my Pocket written by Marc Harshman

The Rock Quarry Book written by Michael Kehoe

The Rock written by Peter Parnall

Finding the Green Stone written by Alice Walker

The Hill and the Rock written by David McKell

On my beach there are many pebbles written by Leo Lionni

Mr. Meredith and the truly remarkable stone written by Grace Chetwin

Water is Wet written by Penny Pollock

Puddles and Ponds written by Rose Wyler

Follow the water from brook to ocean written by Arthur Dorros

Water's Way written by Lisa Westberg Peters

Gilberto and the Wind written by Marie Hall Ets

Feel the Wind written by Arthur Dorros

Earth Science
Songs and Fingerplays
Resources

More Piggy Back Songs by Jean Warren, 1984
Old Volcano

Piggy Back Songs by Jean Warren, 1984
Trash
I See the Wind

The following fingerplay/songs were written by Karla Payne, MA

Dig, Dig, Dig (Sung to "Row, Row, Row Your Boat")

Dig, dig, dig the ground.
Look for rocks today.
Some are big, and some are small.
Find them anyway.

Air Is All Around Us (Sung to "Frere Jacques")

Air is all around us, air is all around us.
It takes up space. It takes up space.

You can feel it everywhere, you can feel it everywhere.
Feel the air, feel the air.

Let's Dig Rocks (Sung to "Frere Jacques")

Let's dig rocks, let's dig rocks.
Now let's sort them, now let's sort them.
These two are the same, these two are the same.
These are different. These are different.

What Will Float (Sung to "Row, Row, Row Your Boat")

What, what, what will float?
We can't wait to see.
How many things will float in the water?
One, two, three.

Water Freezes (Sung to "London Bridge")

Water freezes when it's cold,
When it's cold, when it's cold.
Water freezes when it's cold.
It turn to hard, hard ice.